



Confederation of Indian Industry



CI-ITC Centre of Excellence  
for Sustainable Development



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GmbH



# IBBI

INDIA BUSINESS &  
BIODIVERSITY INITIATIVE



**BUSINESS  
AND BIODIVERSITY  
IN INDIA:**  
20 ILLUSTRATIONS





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# Contents

## 01 Foreword

- 02 - Prakash Javadekar, Minister of State  
Information & Broadcasting (Independent Charge)  
Environment, Forest & Climate Change (Independent Charge) and  
Parliamentary Affairs Government of India
- 03 - Edgar Endrukaitis, Director, Indo-German, Biodiversity Programme
- 04 - R. Mukundan, Chairman, India Business & Biodiversity Initiative,  
Managing Director, Tata Chemicals Limited

## 05 Preface

- 06 - Hem Pande, Additional Secretary & National Focal Point to CBD

## 07 Executive Summary

## 09 Introduction

## 21 Case Studies

- 22 - ITC Limited - Agri Business Division
- 28 - Tata Chemicals Limited
- 38 - The Tata Power Company
- 46 - TVS Motor Company
- 53 - WIPRO

## 59 Case Briefs

- 60 - ACC
- 66 - Ambuja Cements Limited
- 71 - Bajaj Group
- 78 - Biodiversity Conservation India Limited
- 84 - Godrej & boyce Mfg. Co. Ltd.
- 89 - Jain Irrigation
- 93 - Mahindra Lifespaces
- 97 - Paharpur Business Centre
- 102 - Reliance Infrastructure Limited - Dahanu Plant
- 106 - Rio Tinto - Bunder Diamond Project
- 110 - The Royal Bank of Scotland N.V. India
- 115 - Sesa Sterlite Limited - Sanquelim Iron Ore Mine
- 121 - Tata Consultancy Services
- 127 - Tata Housing
- 133 - Tata Steel

## 137 Conclusion

# FOREWORD



प्रकाश जावडेकर  
*Prakash Javadekar*



राज्य मंत्री  
सूचना एवं प्रसारण (स्वतंत्र प्रभार)  
पर्यावरण वन और जलवायु परिवर्तन  
(स्वतंत्र प्रभार) और  
संसदीय कार्य  
भारत सरकार

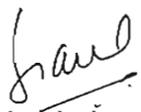
Minister of State  
Information & Broadcasting (Independent Charge)  
Environment, Forest & Climate Change  
(Independent Charge) and  
Parliamentary Affairs  
Government of India

## FOREWORD

India is a recognised mega-diverse country, rich in bio-diversity and associated traditional knowledge. With only 2.4% of the World's land area, India accounts for nearly 7% - 8% of globally recorded species, while being home to 18% of the human population. The pressures on our bio-diversity are, therefore, intense. Notwithstanding this, conserving our rich bio-diversity is a national priority, as it is linked to securing livelihoods of millions of our local people. India, with a strong institutional, legal and policy framework, is recognised as a leader in conservation and sustainable use of bio-diversity. Having successfully hosted the eleventh Conference of the Parties (CoP) to the Convention on Biological Diversity, India is steering the global agenda on bio-diversity in the context of sustainable livelihoods during the UN Decade on Bio-diversity 2011-2020.

Industry is an important stakeholder in bio-diversity. All businesses, regardless of size, sector and location ultimately depend on bio-diversity. In this context, establishment of India Business & Bio-diversity Initiative (IBBI) supported by this Ministry marks a milestone, where the government, business and non-government sector have joined hands to preserve the rich bio-diversity found in the country. I applaud the industry leaders that have shown public commitment towards conservation and sustainable use of bio-diversity, by being part of this noble initiative.

I am pleased that this publication has been brought out during India's Presidency of CoP by the CII-ITC Centre of Excellence for Sustainable Development and German International Co-operation (GIZ). The case studies presented would help in spreading awareness and knowledge on bio-diversity management by business. The report, I hope, would also contribute in India's efforts to achieve the National Bio-diversity Targets.

  
(Prakash Javadekar)

## FOREWORD

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), operating in more than 130 countries worldwide, supports the German Government in achieving its objectives in the field of international cooperation for sustainable development. Indo-German Development Cooperation exists in India for the past 60 years, with energy, environment and sustainable economic development as the key areas of operation. The German Federal Ministry for Economic Cooperation and Development (BMZ) commissions our TEEB India Project, which supports India Business & Biodiversity Initiative (IBBI).

With the aim of engaging private enterprises in the achievement of the Convention on Biological Diversity (CBD) objectives, GIZ pioneered Biodiversity in Good Company in Germany, which is one of the first business and biodiversity initiatives of its kind. We are happy to support the IBBI, where the Indian companies have joined hands to work towards enhancing their biodiversity management. IBBI with its broad-based multi-stakeholder approach, involving business, government, non-government organisations and academia, serves as a national platform for dialogue, sharing and learning, ultimately leading to mainstreaming sustainable management of biological diversity into businesses. India, now a member to Global Partnership for Business and Biodiversity at the CBD, is amongst the forerunner countries which have taken lead in strengthening private sector engagement in the fields of biodiversity and ecosystem services.

As a part of this initiative, the CII-ITC Centre of Excellence for Sustainable Development is compiling case studies from diverse sectors and regions in India about companies who have made significant contributions in terms of innovative and sustainable practices in effective biodiversity management.

The document is the result of excellent team work and synergy of contributions from different organisations and institutions. I wish to place on record our deep appreciation of this effort and hope that the business community and relevant stakeholders will find this compilation interesting and informative. And finally, I would like to express our sincere thanks to Ministry of Environment, Forests and Climate Change (MoEF&CC) and CII-ITC Centre for hosting and supporting this initiative.



**(Edgar Endrukaitis)**  
**Director, Indo-German**  
**Biodiversity Programme**



Confederation of Indian Industry



CII-ITC Centre of Excellence  
for Sustainable Development

## FOREWORD

Nature is an essential economic factor as it provides a variety of renewable and non-renewable resources. Today's overuse and misuse of ecosystem services and resulting impacts on biodiversity are expected to limit business opportunities and profits in the future. For instance, continued loss of natural capital will diminish supply and raise the cost of key production inputs such as fish for the food sector, trees for the forest sector and raw materials for biochemical industries. Other risks associated with biodiversity loss range from disruption of operations to reputational and financing risks.

With over two thirds of Indian population dependent locally on natural ecosystems for subsistence means of livelihood, business cannot longer ignore its impacts on biodiversity as we head towards sustainable and inclusive economy. Preservation of biodiversity offers not just solutions to the pressing environmental and social issues faced by the nation, but also variety of business opportunities. Enhanced competitiveness and increased consumer acceptance of products and services, on the one hand, and emerging markets for ecosystem services, on the other hand, are the key benefits for companies to engage in conservation of natural capital.

Thanks to a new initiative by the CII-ITC Centre of Excellence for Sustainable Development, I am privileged to chair the India Business & Biodiversity Initiative (IBBI) that is a national platform for business and its stakeholders. Endorsed by the Ministry of Environment, Forests & Climate Change (MoEFCC) and supported by the German International Cooperation (GIZ), the IBBI is set up to mainstream sustainable management of biodiversity into business. The signatories to IBBI Declaration recognise the enormous value that nature provides and demonstrate committed to take action in preserving biodiversity – the backbone of functioning ecosystems.

In its endeavour to spread awareness and knowledge on biodiversity management by business, this case study report presents initiatives in biodiversity conservation and sustainable use of Indian companies. I would like to applaud these corporates for being role models in preservation of biodiversity and encourage more companies to follow suit.

**(R. Mukundan)**

**Chairman, India Business & Biodiversity Initiative  
Managing Director, Tata Chemicals Limited**

# PREFACE



**HEM PANDE**  
**Additional Secretary**  
**&**  
**National Focal Point to CBD**



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26<sup>th</sup> August, 2014

## PREFACE

Unique geological and cultural features of India coupled with mixed eco-climatic conditions have resulted in rich biodiversity. India harbours 7-8% of globally recorded species across country's ten biogeographic zones. India also has four of the 34 global biodiversity hotspots- the Himalaya, Western Ghats, North-East and Nicobar Islands, where high level of biodiversity can be found that is under threat from human activity. Country's rapid economic growth witnessed over the past few decades has contributed to the loss of species at an accelerated pace. The rate of extinction now is nearly 1000 times of the 'natural' rate.

In pursuance to the Convention on Biological Diversity (CBD), to which India is a Party, India enacted the Biological Diversity Act in 2002, and notified the Rules in 2004. Formulated through a comprehensive inter-ministerial process, the National Biodiversity Action Plan (NBAP) was approved in 2008. The NBAP provides a roadmap for conservation and sustainable use of biodiversity. Though broadly aligned with the Strategic Plan for Biodiversity 2011-2020, India is updating the NBAP by including the 12 Aichi National Biodiversity Targets developed in line with the Aichi Targets in consultation with stakeholders.

This Ministry is also increasingly engaging with the business as an important stakeholder on biodiversity. Towards this, an India Business and Biodiversity Initiative has been launched to serve as a national platform for dialogue, sharing and learning for mainstreaming biodiversity concerns into business. I express my appreciation to the members of IBBI, and encourage more companies to join IBBI and adopt practices and strategies for management of biodiversity in their operations and across value chains.

Though this case study report, I am pleased to see the work taken up by business in the area of conservation and sustainable use of biodiversity. The study features exemplary initiatives from various parts of India, demonstrating the industry's willingness to come forward in preserving India's natural environment. Apart from being an inspiration for Indian counterparts to follow suit, it is a knowledge source of good business practices for any company globally.

  
(Hem Pande)



# EXECUTIVE SUMMARY



Biodiversity is essential for the survival of life on our planet. The Convention on Biological Diversity defines it as 'the variability among living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.<sup>1</sup>It provides a number of vital and indispensable services which sustains life on earth.

This report highlights the initiatives of 20 companies across sectors - mining, construction, manufacturing, IT, finance, energy, chemicals, and agri-business - in biodiversity management and conservation within their operations and through their CSR activities. It cannot be denied that in recent years business has played a role in exacerbating the exploitation of natural capital through its activities. The locations of a company's site, the supply chain it engages with, the materials it utilises, the technologies it uses for production and manufacturing activities, the way it transports its goods, the end-products it creates, and the personnel culture it promotes all have impacts on biodiversity. Habitat transformation, climate change, invasive species, overexploitation, and pollution are the key areas that are affected.

However, there is a growing realisation in the corporate world that for the long term sustainability and viability of any business it

must not only mitigate its adverse impacts as much as possible but also behave more responsibly in the future. Ecological costs have to be accounted for in all business decisions and activities. Directly or indirectly, business depends on biodiversity and ecosystem services and has some kind of impact on nature. If impacts and needs are not recognised and assessed business faces several risks and could also lose out on profitable opportunities. Through their interventions, these companies have addressed the resulting changes in landscape which alter natural habitats, pollution, climate change, spreading of invasive species and the problem of exploitation.

IBBI, which was set up in 2014, speaks for the leadership of the Indian industry and the increasing initiative it is taking to address biodiversity concerns. Through IBBI not only is the industry taking proactive steps to affect positive impact but are also acting as champions for biodiversity. Members of the IBBI have signed a 10-point declaration committing to achieve the action points it enumerates, thus setting an example for other companies to follow.

While different sectors are affected by and affect biodiversity and ecosystem services to differing degrees, there is a unified will to take action in order to manage and conserve them efficiently and sustainably.

<sup>1</sup>CBD (1992). Convention on Biological Diversity. 5 June 1992, Rio de Janeiro (Brazil).

# INTRODUCTION



Biodiversity, defined as variability among living organisms and the ecological complexes of which they are part<sup>1</sup>, is of crucial value for life to thrive on Earth. The benefits arising from biodiversity are vital for provision of ecosystem services, biological resources and social goods. However, human activity of the past 50 years has altered ecosystems faster and more extensively than ever before in human history<sup>2</sup>. Habitat change, non-native invasive species and overexploitation are the main causes for the loss of biodiversity, with as many as 150-200 species of plant, insect, bird and mammal becoming extinct every day<sup>3</sup>.

India, recognised as one of megadiverse countries, accounts for 7.8 per cent of recorded species in the world, including 45,500 and 91,000 species of plants and animals, respectively. Forests, grasslands, wetlands, deserts, and coastal and marine ecosystems represent exemplary diversity of ecological habitats in this country, where traditional and indigenous knowledge goes hand in hand with increasing size of population and industrialisation. The rapidly growing trajectory of Indian economy has often led to an inefficient use and overexploitation of biodiversity, affecting livelihoods and socio-economic conditions of millions of people.

Business and biodiversity are interlinked through ecosystem services, globally

valued at \$125 trillion a year<sup>4</sup>, that are vital for economic activities. It is estimated that approximately 40 per cent of the world's economy is based on biological products or processes. The loss of biodiversity is therefore jeopardising the very basics of a healthy economy, posing certain threats for companies varying from operational, regulatory and reputational risk to limited access to capital.

The business awareness and response to the loss of natural capital has been limited up to date. Less than one in five firms see biodiversity as an important business issue, while just two of the world's top 100 companies manage it as a strategic risk<sup>5</sup>. Similarly, the Indian industry too has been paying very less attention to biodiversity management, whilst the issues of pollution, climate change and water scarcity have been on corporate agendas for a while. Nevertheless, biodiversity conservation has been a national priority for several decades, with India having ratified the Convention on Biological Diversity (CBD) in 1994.

Adopted at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, the CBD is one of a number of conventions that aim to achieve sustainable development. The Convention sets out three objectives, namely conservation of biological diversity, sustainable use of its components and fair and equitable sharing of benefits arising

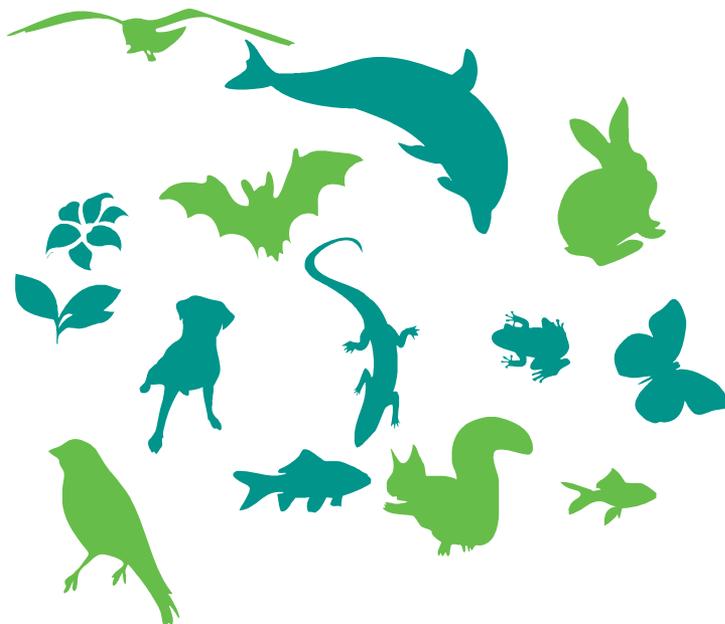
<sup>1</sup>CBD (1992). Convention on Biological Diversity. 5 June 1992, Rio de Janeiro (Brazil).

<sup>2</sup>United Nations (UN), (2005). Ecosystems and Human Well-being: Biodiversity Synthesis. World Resources Institute: Washington DC (USA).

<sup>3</sup>United Nations Environment Programme (UNEP), (2010). The State of the Planet's Biodiversity, World Environment Day 2010

<sup>4</sup>Costanza, R., de Groot, R., Sutton, P., van der Ploeg, S., Anderson, S.J., Kubiszewski, I., Farber, S. and Turner, R.K. (2014). Changes in the Global Value of Ecosystem Services. *Global Environmental Change*, 26, 152-158

<sup>5</sup>United Nations Environment Programme (UNEP), (2010). The State of the Planet's Biodiversity, World Environment Day 2010. Retrieved August 10, 2014 from <http://www.unep.org/wed/2010/english/biodiversity.asp>



from the utilisation of genetic resources. In 2010 the CBD released its Strategic Plan for Biodiversity 2011-2020, which includes the Aichi Biodiversity Targets - 20 ambitious goals spanning across 5 strategic areas to be achieved by 2020 (see Figure 1, page no. 13). By 2020, governments have agreed to halt and eventually reverse the loss of biodiversity on the planet.

With increasing public awareness on the threat posed by the loss of biodiversity and its implications for global economy, several countries around the world are facilitating greater private sector engagement with the Convention. On invitation by the Ministry of Environment, Forests & Climate Change (MoEFCC), Government of India, the CII-ITC Centre of Excellence for Sustainable Development is hosting the India Business & Biodiversity Initiative (IBBI) with the support of Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). The IBBI is part of the Global Platform for Business and Biodiversity – a hub for national and international initiatives that directly interact with companies.

Launched on the occasion of International Day for Biological Diversity on 22<sup>nd</sup> May,

2014 in New Delhi, the IBBI serves as a national platform of business and its stakeholders for dialogue, sharing and learning, ultimately leading to mainstreaming sustainable management of biological diversity into businesses. Its vision is to sensitise, guide and mentor Indian business organisations in biodiversity conservation and sustainable use related to their operations, across their value chain and beyond towards conservation of India's biodiversity. The members of IBBI are signatories to a 10 - point IBBI Declaration, demonstrating public commitment towards preserving biodiversity.

In an endeavour to create greater awareness and knowledge in corporate biodiversity management, the Centre has carried out research among Indian companies with significant biodiversity footprint. This report showcases a number of good business practices in conservation and sustainable use of biodiversity, presenting 5 detailed case studies and 15 case briefs of biodiversity initiatives taken up across diverse locations in the country.

# Methodology

In the first step of the study, a sample of companies with high biodiversity footprint, either directly or indirectly, was developed. Although the scope of the study did not allow showcasing each sector across all regions, an attempt was made to keep overall balance of sectors and regions. From each identified sector, top listed companies as per market capitalisation were selected. Furthermore, a snowball method was deployed to include any smaller companies that are good examples for corporate biodiversity management.

The next phase comprised of an online survey, where companies were asked about any biodiversity-related initiatives. These initiatives could have fallen into a wide range of fields of action, such as sites and facilities; supply chains, commodities and materials; product; production and manufacturing processes; transport and logistics; and personnel. Habitat transformation, climate change, invasive species (Neobiota), overexploitation and pollution were the

biodiversity impact factors that were sought after. Examples on how the fields of action can affect the biodiversity impact factors are showcased in Figure 2, page no. 16. Furthermore, companies were questioned about the importance of biodiversity for the organisation and future plans in biodiversity management.

Out of the submitted responses, 5 companies were selected for detailed case studies based on the scale and impact of initiatives. For these case studies a site visit was undertaken to interview the personnel involved in the management of biodiversity initiatives as well as any concerned stakeholders. In addition to documentation of site-specific initiatives, detailed case studies showcase activities taken up across entire company as a contribution to the Aichi Biodiversity Targets. The remaining 15 companies are presented in the report in case briefs based on the survey responses as well as any secondary data available via reports and publications.

# Figure 1: Aichi Biodiversity Targets

## Strategic Goal A:

Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society



By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.



By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.



By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimise or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.



By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimise or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.

## Strategic Goal B:

Reduce the direct pressures on biodiversity and promote sustainable use



By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.



By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.



By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.



By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.



By 2020, invasive alien species and pathways are identified and prioritised, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.



By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimised, so as to maintain their integrity and functioning.

### Strategic Goal C:

To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity



By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.



By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.



By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

### Strategic Goal D:

Enhance the benefits to all from biodiversity and ecosystem services



By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.



By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.



By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation is in force and operational, consistent with national legislation.

## Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building



By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.



By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.



By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.



By 2020, at the latest, the mobilisation of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilisation, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

## Figure 2: Examples on How Fields of Action Can Affect Biodiversity Impact Factors.

	<b>Sites and facilities</b>	<b>Supply chains, commodities and materials</b>	<b>Product</b>
<b>Habitat transformation</b>	Space required for buildings Habitat fragmentation	Space required for production	Area and volume requirements of the project
<b>Climate change</b>	Power demand and CO <sub>2</sub> emissions of buildings Ground storage of CO <sub>2</sub>	Power demand and CO <sub>2</sub> emissions Reduction of carbon sinks in production of raw materials	Power demand and product CO <sub>2</sub> emissions Ozone-depleting substances in products
<b>Invasive species (Neobiota)</b>	Location of site may accommodate invasive species (for example, ragweed)	Cultivation of new, non-native resources	Product design may lead to spreading of invasive species
<b>Over-exploitation</b>	Drainage of wetlands Erosion caused by agriculture	Overfishing Monoculture Homogenization of agriculture	Service features and product attributes can have an impact on biodiversity
<b>Pollution</b>	Release of climate gases from depletion of forests and drainage of wetlands Dust Building shadows	Overfertilisation Waste water	Product usage may cause emissions (for example, waste water, noise, air pollutants) Product as waste

	<b>Production and manufacturing processes</b>	<b>Transport and logistics</b>	<b>Personnel</b>
<b>Habitat transformation</b>	Land needed for production facilities Discharge of heated waste water	Space required for roads and storage Roads and pipelines cross migratory species routes	Habitats constructed in an employee volunteering project
<b>Climate change</b>	Power demand and CO <sub>2</sub> emissions Need for ozone-depleting substances in production	Power demand and CO <sub>2</sub> emissions caused by transportation	Employee behaviour impacts power demand and therefore greenhouse gas emissions
<b>Invasive species (Neobiota)</b>	Production processes may promote spreading of invasive species	Spreading of invasive species by transport of resources and products	Employee behaviour has impact on spreading of invasive species
<b>Over-exploitation</b>	Excessively sized facilities may generate increased demand for resources and lead to over exploitation	Parking space management	Employee behaviour has impact on biodiversity
<b>Pollution</b>	Wastewater Emissions caused by production	Separation of oil Detergent and waste water Particulate matter	Emissions caused by employee business travel

Source: Schaltegger, S. and Beständig, U. (2012). Corporate Biodiversity Management Handbook: A Guide for Practical Implementation.

# Key Findings

This report covers the biodiversity related initiatives of 20 companies in India and includes both measures they have taken within their business and operations, as well as efforts in biodiversity conservation and protection outside of the scope of their company activities.

Mining, construction, manufacturing, energy, chemicals, agri-business, and IT and finance are the sectors to which these companies belong. The impact areas that have been addressed by the various interventions of the companies are: habitat transformation, climate change, invasive species, overexploitation, and pollution. These impact areas have been defined as per the Corporate Biodiversity Management Handbook brought out by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Germany<sup>6</sup>.

## ► Habitat Transformation

Change, fragmentation or destruction of habitats has an adverse effect on the ecosystem that exists within those habitats, and thereby on the services it provides to people, to the community, and to businesses. All companies across each of the sectors are focusing on habitat transformation, many have activities in locations of their sites and facilities, in supply chains, materials, products, production and manufacturing processes, amongst

employees, or through CSR programmes that focus on habitat and species conservation in geographies where they have no business activities.

## ► Climate Change

Ecosystems are also affected by changes in climate. It can modify species behaviour, reproduction, competitiveness, and feeding relationships which could result in the shifting of their geographies that endanger the species whose original range shrinks or disappears. Business action on climate change seems most mature due to the attention received in the last one decade and the direct business implications on the cost of doing business. The companies are addressing climate change by reducing emissions at sites and in production and manufacturing processes, and using energy efficient materials to create environment friendly products.

## ► Invasive Species

Invasive or non-native species are harmful as they can endanger the native species by displacing them, transmit diseases, and can also result in the changing the genetic pool. Companies have addressed the problem of invasive species at sites and facilities as well as surrounding areas, by ensuring there is no spread of the existing invasive species, destroying or uprooting them, and through plantations of only native species.

<sup>6</sup>Schaltegger, S. and Beständig, U. (2012). Corporate Biodiversity Management Handbook: A Guide for Practical Implementation.

## ► Overexploitation

Overexploitation of natural resources and that of certain faunal species lead to biodiversity loss. Natural resource management has been undertaken by companies in sites and facilities, manufacturing and production activities, and within supply chains and materials that they use.

## ► Pollution

Toxic substances and pollutants, such as solid, liquid and gaseous waste threaten biodiversity and the ecosystems that they survive in. Pollution has been addressed by companies at sites, in supply chain and materials, in production and manufacturing, in transportation, in final products, and even amongst personnel. Pollution is the most mature area of intervention. This is because the environmental movement started with alarms raised about increasing pollution. Over the decades, regulatory norms and standards have only increased to reduce pollution. Pollution is also the most visible and measured area of impact and therefore gets managed.

The business case for managing and conserving biodiversity and ecosystem services vary. For companies which could have a significant negative impact (particularly in the case of habitat alteration), especially those in the mining, construction, and energy industry, the primary driver is the

social and regulatory license to operate, as well as to uphold their reputation as a responsible company. Companies with relatively less and indirect impact on biodiversity such as the finance and IT industry, also factor in the value its initiatives, whether in their operations or through their CSR initiatives, add to their reputation and brand value for their customers. Several companies are incorporating biodiversity and ecosystem factors within their business models, and thus creating a positive impact through their business activities by using machines and technologies that contribute to their management and conservation. Innovation is also a driver for a few companies, who from the outset are creating products which from their conception to their final delivery are taking biodiversity into account and that will appeal to the rising consciousness of customers. Another business case is risk mitigation, more so for industries like manufacturing, agri-business, chemicals, energy, construction and mining, which are dependent on ecosystem services, especially natural resources, and must take measures to ensure their future availability.

However, that is not to say that other industries are not responsible for biodiversity and ecosystem services. All businesses depend on them either directly or indirectly and companies must ensure that they are managed sustainably to ensure their own viability in the future.



# CASE STUDIES



# ITC Limited - Agri Business Division

*ITC Limited is one of India's private sector companies with businesses in FMCG, hotels, paperboards & specialty papers, packaging, agri-business, and information technology. The company's agri-business is one of the largest exporters of agricultural products. E-Choupal, an initiative by the company, has enhanced the competitiveness of Indian agriculture by empowering farmers through the internet. This strategy has already become the subject matter of a case study at Harvard Business School. The Agri-Business Division (ABD) of ITC Limited is among the large buyers, processors and exporters of various crops in India - creating a global benchmark as the single largest integrated source of quality agri-crops in India.*



## Relationship to Biodiversity

Agriculture and agricultural practices can have a significant impact on biodiversity, altering habitats and affecting ecosystems, ultimately leading to biodiversity loss. As a

company directly dependent on farmers and their produce, ABD through its extension services engages with them to adopt better and more sustainable practices.

## The Business Case

Maintaining and preserving biodiversity is essential for the sustainable husbandry of agricultural products. ABD's policy on biodiversity states that 'the division will minimise its impact on biodiversity and the environment, which involves avoiding, minimising, and mitigating impacts on biodiversity and linked ecosystem services such as forest products, soil and water'. It believes that its success today, and in the future depends on biodiversity and

ecosystem services. Not only would their loss affect their reputation, it would also affect the availability of the crop. As they believe, a risk for the farmer and the crop is ultimately a risk for ABD.

Internationally too biodiversity standards have been set by importers and other companies and monitored as part of social audits with their suppliers, including ITC Limited.

# Biodiversity Risk and Opportunity Assessment

ABD, partnering with EarthWatch Institute, UK, has implemented the Biodiversity Risk and Opportunity Assessment Tool (BROA) across its crop growing regions. This tool provides a method to identify impacts and dependencies of business operations on biodiversity of a given agricultural landscape, followed by an assessment of various risks and opportunities that emerge, based on which plans are made and actions undertaken to address them.

ABD has implemented the BROA tool in 2013 in its crop development regions, that is, Karnataka and Andhra Pradesh. Through its extension services ABD works with more than 100,000 farmers to help them produce quality crops. However, for most crops in India, ABD cannot buy the produce directly from the farmers, but has to bid for it along with other bidders, through an auction governed by government controlled platforms.

Realising the extent to which agriculture depends on ecosystem services and the consequent impact it has on it, ABD starts its intervention at the crop development stage, to ensure the sustainable cultivation of crops. For the sustainable production of crops, it is essential to preserve the natural ecosystem. ABD identified five elements of sustainability - soil, water, fuel, labour and biodiversity - biodiversity being the entire variety of life and encompassing soil, water and fuel. All these elements are central to



any crop cultivation, and any adverse impact on them will affect the crop and its productivity. Through its extension services the company addresses all these five elements.

For ABD the focus is not on species conservation for addressing biodiversity concerns, but the identification of any potential negative impact on ecosystem services and how to mitigate them. Some of the negative impacts of agricultural activity include habitat alteration, over harvesting, pollution, introduction of invasive species, and climate change, and is therefore, a major contributor to the loss of biodiversity.

Through BROA, ABD has identified the risk and opportunities related to terrestrial biodiversity, soil biodiversity and aquatic biodiversity. A collaborative effort, the company engages with local community, NGOs, universities, conservation organisations, governments and the farmers, through all the three stages of the implementation of BROA, that is, planning

and information gathering; identifying, investigating and prioritising risks and opportunities; and action and monitoring plans.

The first stage involves gathering existing knowledge and data on the landscape through the various databases, such as that of the company itself, of various NGOs or conservation organisations, agriculture universities, government bodies, the local communities and any other relevant stakeholder. Information such as population in the landscape, the area of the landscape, the major crops grown, the soil type and structure, the nutrient composition of the soil, the number of borewells and tanks for irrigation, etc. This stage takes about two months.

Stage two identifies the various risks that might exist in the landscape. Here, through interactions with stakeholders, especially farmers, corroborations are made of the observations that come out of the first stage. Based on these interactions and information gathered from the first stage, a Mandatory Risk Filter is filled out. In this stage, for example under the head of soil biodiversity, a comprehensive list of possible risks is created and YES or NO answers are given to these possible risks in a given landscape.

Once these risks are identified, along with the stakeholders, the primary and secondary causes of the risk are assessed.

Following this the potential negative impact of these risks are determined, both for environment and biodiversity and for the business.

If there is even one YES in the biodiversity aspects, the business has to acknowledge it as a risk that is to be addressed. Finally, the risks and opportunities are prioritised as high/medium/low from a Biodiversity Impact Score and Biodiversity Dependency Score. Following which a prioritisation of all medium or high biodiversity risks are identified through a Working Table which determines whether the risks and opportunities are regarded as high, medium or low.

In stage three, based on the risks evaluated and prioritised, action plans are made. Even for low risks action plans are recommended so that they do not become high risk in the future.

ABD identified the following risks in the landscapes in Mysore and has taken actions to address them:

**1. Decline in water flow / quantity / water table:** Rainwater harvesting measures have been taken to revive and increase the water table and improve the water flow which had declined because of increasing siltation and groundwater extraction. ABD has constructed and rehabilitated several tanks for water storage and removed 1.1 million cubic metres of silt. These tanks are usually found at the bottom of slopy areas where water runs off.

**2. Soil erosion:** When untreated, about 13.5 metric tonnes of soil per hectare is eroded every year. The soil lost is usually topsoil which is high in nutrient and organic content. In order to prevent this erosion, farmers were encouraged to carry out trenching and bunding on their fields. All the

topsoil that is eroded and settles in the tanks are taken out and deposited back on the farmer's field.

### **3. Loss or lack of natural vegetation:**

Several biodiversity parks have been set up to encourage natural vegetation and prevent habitat loss. These parks are on about 5-6 acres of community land, with the community involved in its maintenance and protection and ABD providing the saplings and fencing. Many native and endangered species of flora have been planted in these parks and is serving as a sanctuary for endangered local plant species that have livelihood significance for the surrounding pastoral and agrarian community. In parallel purpose the parks are playing a significant role in educating the local community with linked training programmes on the importance of conserving native species and their importance in the future.

**4. Pollution:** Sustainable agrochemical management has been introduced to prevent soil pollution. Instances of disposal of toxic pesticide waste bottles in the fields were discouraged and farmers were made aware of environmentally responsible agrochemical selection, handling, application, storage and disposal.

**5. Fuel:** For fuel wood requirements of households, farmers use wood and agri-waste for fuel. ABD is encouraging farmers to deploy energy conservation techniques and energy plantations for fuels self-sufficiency. Here farmers are told to plant relatively fast growing trees, in this case, Eucalyptus, on their farms which they can use for fuel.



In 2013-14 around 1,630 ha was brought under soil and moisture conservation and two large water tanks were rehabilitated in the BROA landscapes in Mysore as an outcome of the study. Over 62 million litres of water storage was created and more than 5,000 marginal households have benefitted. Groundwater levels have also been reported to have increased significantly because of this initiative.

58,000 cubic metres of silt retrieved from the tanks have been applied on the 1,630 ha of agricultural land, which has improved soil texture and improved its organic content, resulting in a positive impact on crop production. It has also led to reduction in the use of inorganic chemical fertilisers in the areas of intervention.

More than 7,000 native species are protected in six biodiversity parks which cover a land area of 10 acres in Mysore region.

The introduction of the agro-forestry model and energy plantation was a significant milestone that was achieved during the year and in Mysore district almost 2,000 ha of energy plantations were undertaken providing extra income to the farmers. Apart from the obvious benefits of increasing the vegetation cover, this effort also directly contribute to in situ moisture conservation and significant reduction in top soil losses due to wind and water erosion.

# Challenges

A comprehensive and exhaustive tool, the implementation of BROA is not without its challenges. The primary challenge lies at the ground level while getting the farmers to adopt new practices. Given the participatory approach ABD employed, involving the

community at all levels, raising awareness, making exposure visits and demonstrating the effectiveness of the interventions, the company was able to overcome the doubts and apprehensions of the farmers.

# Way Forward

At present, ITC Limited Agri-Business Division is the only agri-business company in India and a very few in the world to have conducted a biodiversity risk assessment of its crop growing operations in a strategic manner by using an assessment tool. ABD will continue to engage with farmers and all other stakeholders in

protecting and preserving biodiversity and encouraging the uptake of interventions it has introduced following the application of the BROA tool. Currently the company is carrying out an impact assessment on the various initiatives undertake.

# Contribution to the Aichi Targets



Through its extension services, ABD is creating awareness amongst farmers about the biodiversity risks they face, and how they can address and conserve biodiversity and gain from its benefits.



ABD is working with farmers in its crop development regions to implement agricultural practices that are more efficient, conserve resources and are sustainable.

# Tata Chemicals Limited

## Giving Back to Mother Earth

*With a history of 75 years since its inception, Tata Chemicals Limited, part of the Tata Group, is a global company with presence in chemicals, fertilizers, food additives and agri-services. The company defines its business focus to be on LIFE – a formula that stands for living, industry and farm essentials. Tata Chemicals is a major domestic player in the branded and iodised salt segment as well as in urea and phosphatic fertilisers. On the global front, it has the second largest production capacity of soda ash in the world.*

*Spanning across four continents, Tata Chemical's manufacturing facilities are located in India, UK, Kenya and the USA, serving a customer base all over the world. In India, it operates the country's largest integrated inorganic chemical complex at Mithapur, Gujarat and fertilizer plant in a Babrala, Uttar Pradesh.*

# Relationship to Biodiversity

By and large the chemical industry has a medium risk for biodiversity, falling in the 'amber zone' in which companies are likely to be exposed to biodiversity risks and these risks may be significant<sup>1</sup>. There is a fair amount of uncertainty over impacts to ecosystems of chemical products, since many of these have not yet been assessed for their risks to biodiversity. Overuse of natural resources (e.g. water) and improper waste handling and disposal, particularly of hazardous waste generated from the chemical production, are other likely affects of this industry.

The biodiversity footprint of Tata Chemicals in India is primarily based upon its coastal solar saltworks. The surrounding ecosystems are refuge zones for many species of migratory birds, making it imperative to promote conservation of these saline wetlands. In addition to preserving biodiversity at its sites and facilities, Tata Chemicals has taken a proactive approach towards conservation of flora and fauna in the surrounding community. Driven by commitment to sustainability that is believed to ensure global competitiveness, the company has taken a number of steps to safeguard natural capital.



<sup>1</sup>F&C Asset Management plc (2004). Is Biodiversity a Material Risk for Companies: An Assessment of the Exposure of FTSE Sectors to Biodiversity Risk. ISIS Asset Management: Edinburgh (UK)

# Flora and Fauna Conservation at Mithapur: Dharti Ko Aarpan (Giving back to Mother Earth)

## The Business Case

The chemical plant and saltworks at Mithapur fall in the Okhamandal region of Gujarat, a peninsula bounded by the Gulf of Kutch on east and north and the Arabian Sea on the west. The area forms an important part of the Gulf of Kutch Marine National Park and is well known for its unique marine and coastal resources: rich coral reefs, lush mangrove stands, turtle nesting beaches, bird nesting and roosting areas. In our day, substantial development activities are executed or planned in the region, putting its rich biodiversity under threat. Salinity ingress and habitat change are the main factors that are causing the loss of species in the area.

As a user of ecosystem goods and services (e.g. sea water), Tata Chemicals has recognised that biodiversity is vital for livelihoods of people, development need of industries and inclusive growth of the country. The company has realised the need to develop and implement an integrated coastal ecosystems conservation approach for the region as a whole, involving various stakeholders such as government departments, NGOs and local community. For this reason, the “Dharti Ko Aarpan” (Giving back to Mother Earth) program was launched in 2008, with an

objective to conserve coastal ecosystems and protect endangered species.

The program includes a variety of flora and fauna safeguarding projects, ranging from whale shark, Asiatic lion and waterfowl conservation to mangrove and coral reef regeneration. The aim of all these initiatives is to ensure sustainability of Tata Chemical’s growth rate along with improvement in the quality of life of nearby communities, whilst not compromising on environment. Healthy, restored ocean and coastal wetland ecosystems provide enhanced economic value. Benefits of coastal restoration include buffering storm surges, safeguarding coastal homes and businesses, sequestering carbon and other pollutants, creating nursery habitat for commercially and recreationally important fish species, and restoring open space and wildlife that support recreation, tourism and the culture of coastal communities.



## Save the Whale Shark

The Save the Whale Shark initiative was launched in 2004, with an aim to protect the endangered whale shark – the largest fish in the world that was once slaughtered along the Gujarat coast for its oil and meat. Implemented in partnership with the Wildlife Trust of India and the Gujarat State Forest Department, Tata Chemicals studied the behaviour and migratory pattern of whale shark and created awareness amongst the coastal communities of the Saurashtra region to attain their support for conservation of this specie. Post the campaign the next step was to understand the ecosystem of the whale shark, including genetic and scientific study of the whale shark and its habitat.

In order to change the mindset of fishing communities, a spiritual leader Shri Morari



Bapu was invited as a brand ambassador. Deriving from Indian traditions, he compared the whale shark to a daughter returning to her maternal home for child birth and questioned the act of slaughtering if the local culture is to take care of the daughter. A street play on this theme was staged at all 14 fishing harbours and settlements along the Saurashtra coast, leading to support from fishermen who pledged to protect the whale shark. The State Forest Department for its part introduced a monetary relief scheme to fishermen whose nets are damaged during the whale shark rescue operation if it gets caught by chance. More than 430 whale sharks have been rescued and released with the participation of the fishing community.

## Biodiversity Reserve Plantation

The indigenous flora of the Mithapur region is being steadily wiped out due to the rampant spread of exotic invasive species called the Gando Baval (*Prosopis juliflora*). Many of the grasslands have been run over by Gando Baval, spreading at the cost of indigenous flora. In this background, the Biodiversity Reserve Plantation was established in 2004. This botanical reserve spread across 150 acres contributes to ex-situ conservation of indigenous and

endangered flora species, including the highly endangered Gugal (*Commiphora wightii*).

In addition to the main reserve plantation, a series of smaller ones are proposed to be replicated in villages around Mithapur for protection of village level flora biodiversity. This would be done through participation by local Eco Club members and the village community.



## Regeneration of Mangroves

As part of a drive to strengthen coastal ecosystems, Tata Chemicals took up a mangrove plantation project in the Okhamandal region in 2007. Initially carried out in partnership with International Union for Conservation of Nature (IUCN) under Mangroves of the Future (MFF) programme, it aims at restoring the original mangrove cover that will help to improve the coastal ecology and provide roosting and nesting sites for aquatic birds. A total area of 172 acres has been covered up to date with a survival rate of around 30 per cent.

## Eco Club

In 2007 Tata Chemicals initiated the Eco Club program with an objective to create awareness amongst community and encourage a participatory approach between the corporate, community and other stakeholders for conservation of local biodiversity. Implementation of this program relies on creation of community based organisations that become champions for nature conservation activities.

A total of 30 Eco Clubs with an outreach of more than 4500 students and teachers have been established in the rural schools around Mithapur. The club members have initiated a process to establish village level biodiversity database, which will aid in identification of conservation needs and setting priorities for preservation of local biodiversity. An Eco Fair competition was launched to spread awareness on local species among community members.



## Save the Asiatic Lion

The Gir National Park in Gujarat is the last stronghold of the endangered Asiatic lion (*Panthera leo persica*). A major threat to about 400 wild Asiatic lions surviving in the Gir Forest is open wells, which cause incidents of wild animals getting killed due to falling into these wells. With this background, Tata Chemicals in partnership with Gujarat State Forest Department launched a project to save the Asiatic Lion in 2008.

The project aims at building parapet walls around open wells to render them safe for lions and other wildlife. The project has helped to mitigate the mortality risk for lions and other wildlife in and around its last stronghold – the Gir Forest. Till date around 1200 wells in the area of Gir Forest have been upgraded.



## Coral Reef Regeneration

Initiated in 2008 and carried out in partnership with Wildlife Trust of India and Gujarat State Forest Department, the objective of this project is conservation of the Mithapur coral reef. The activities include awareness programs, monitoring of marine biodiversity, creation of a coral garden, transplantation of locally extinct *Acropora* coral species as well as other native species in Mithapur waters, and

exploring possibilities to create livelihood linkages through eco-tourism.

Tata Chemicals has completed mapping of the Mithapur reef boundary and its biodiversity. Attempts have been made for long distance transplantation of the *Acropora* corals from Lakshadweep islands as well as creation of artificial reef through propagation of the native coral species.

## Waterfowl Conservation at Charakla Saltworks

The saltworks at Mithapur provide refuge to a diverse spectrum of waterfowl, both native and migratory. Most waterfowl species are near or at the top of the food chain and are sensitive to the health of wetland ecosystems. It also shelters the only known active nesting site for Caspian Terns (*Sterna caspia*) in India. Considering the importance of the Charakla site for waterfowl conservation, a project for providing safe nesting habitats for water birds was taken up in 2011.

An artificial nesting island in midst of a brine pond has been created at the saltworks. More than 400 tonnes of island construction material was transported by small boats to the construction site in shallow waters in midst of a 400 acre brine pond.



Consequently, the island has been readily accepted for nesting by waterfowl and terns, as well as for roosting by cormorants, avocets and pelicans. The project has eased territorial disputes amongst different bird species and individuals, as also reduced the mortality due to overcrowding and flash floods caused by monsoon waters at the earlier nesting site.

## Challenges

One of the major challenges faced by Tata Chemicals is lack of reference information on various species. For example, in case of whale there was a limited research history on this specie. All previous work on whale shark was based more on sighting records and hunting practices in Gujarat. To overcome this, a Scientific Advisory Committee comprising of experts from all over the world was constituted. This team not only assisted in establishing the methodology for the

project but also helped in providing technical support whenever needed.

Other hardships of the “Dharti Ko Arpan” pertain to gaining support and cooperation from the local community. To overcome this challenge in the Eco Club, Tata Chemicals convinced rural school teachers to participate in the program, leading to involvement of large number of students. Participation of employee volunteers to

support schools in biodiversity data collection contributed further to a smooth process of community engagement.

In Save the Whale Shark, overcoming the lack of support from fishermen was accomplished through the involvement of Shri Morari Bapu. This was the first time that a religious leader had taken up the cause of conservation in the country. The call he gave to the fishing community proved to be a turning point in their joining the conservation efforts to save the whale shark.



## Way Forward

In the next phase of the “Dharti Ko Aarpan”, several activities are foreseen for the period 2014-2019, including species and ecosystem conservation along with awareness generation. With this the following goals are expected to be achieved: (1) strengthen and integrate identified and on-going initiatives for coastal and marine conservation, (2) promote stewardship among local coastal communities for conservation and environmental leadership, and (3) provide platforms for knowledge exchange and dissemination of best practices on conservation and management of coastal and marine ecosystems.

Being close to Dwarka city, the area provides an opportunity for visitors to understand and learn about wetland issues and the need for its conservation. Consequently, it is planned to develop the

Chandra Bhaga wetland as a bird tourism site and simultaneously create sustainable livelihood opportunities for the locals, who would be trained in monitoring and management of the wetland and conservation of species.

Another project has been proposed on marine turtle conservation. The coast of Okhamandal plays host to the nesting of two endangered species of marine turtles - Olive Ridley (*Lepidochelys olivacea*) and Green turtles (*Chelonia mydas*). The objective of the project is to create awareness on sea turtles and protect nesting beaches with the support of Eco Club members and community. Besides, support shall be extended to the State Forest Department for establishment of a marine turtle hatchery and a nature interpretation centre at Shivrajpur beach near Mithapur.

# Contribution to the Aichi Targets



The Eco Club program contributes to awareness creation on biodiversity conservation among local community surrounding Mithapur.



Rampant spread of exotic invasive specie the Gando Baval (*Prosopis juliflora*) is being controlled by the company in its nearby area.



Save the Whale Shark has contributed to protection of endangered whale shark by studying its behaviour and migratory pattern as well as creating awareness and gathering support among fishermen of the region.

Save the Asiatic Lion has supported to conservation of endangered Asiatic lion by constructing parapet walls around wells in the Gir Forest area.

Conservation of waterfowl at Charakla saltworks aims at creating the habitat for encouraging breeding of waterfowl around Mithapur.

Ex-situ conservation of indigenous flora species (e.g. endangered Gugal) is implemented via establishment of biodiversity reserve plantation.



Mangrove plantation and coral restoration programs are taken up for conservation of coastal ecosystem as to maintain healthy ecosystems that are vital for the livelihood of local community in the vicinity of Mithapur.



Coastal restoration activities at Mithapur are helping to buffer storm surges, safeguard coastal homes and businesses, and sequester carbon and other pollutants.

# The Tata Power Company

## Lighting up Lives... Sustainably!

*The Tata Power Company Limited, an entity of the Tata Group, is the largest integrated power company in India with installed generation capacity of about 8500 MW. Tata Power commissioned its first hydro power plant in 1915 and today it is a key player with diversified energy portfolio in thermal, solar and wind energy segments. The total generation from renewable energy sources is approximately 14 per cent of the installed capacity.*

*The company has presence across the entire power value chain from fuel and logistics to generation and transmission to distribution and trading. In 2013 Tata Power implemented India's first 4000 MW Ultra Mega Power Project at Mundra, Gujarat based on super critical technology, reflecting Tata Power's thrive for continuous growth and innovation.*

*With its primary base in Mumbai and expansion to other locations in India, Tata Power intends to become a major national player. On the global front, it has established substantial international presence through its projects in Indonesia, Singapore, South Africa, Australia and Bhutan.*

# Relationship to Biodiversity

Tata Power, being in the power sector has been consistently conscious of the various environmental challenges and their possible impacts on biodiversity. The electricity sector is identified as a 'red zone' for biodiversity risk<sup>1</sup>. Red zones are defined as those sectors in which most companies are likely to be exposed to biodiversity risks and the risks are likely to be significant.

Power generation, from both non-renewable and renewable sources, can have a broad range of biodiversity impacts. While the burning of fossil fuels can impact biodiversity through air and water pollution, generation of energy from renewable resources poses certain risks as well. For example, wind turbines can adversely affect wildlife, particularly birds, and building dams for hydroelectric power can affect biodiversity by flooding habitats. Moreover, linear features such as roads and corridors for power lines can fragment habitats and improve access to previously undeveloped areas, which can lead to potential impacts from land conversion, small-scale mining, hunting and logging.

However, it is worth noting that Tata Power's operations are not in close proximity, i.e. 10 km, to any nationally or internationally designated protected areas such as national parks, wildlife sanctuaries, world heritage sites etc. Notwithstanding ambitious expansion plans of Tata Power, the company has committed itself to 'responsible growth'. The steps taken towards preserving the natural capital emanate from production of green and clean energy to creation of sustainable livelihoods for communities to green buildings and villages. Conferring the importance of conservation, a stand-alone biodiversity division has been established within the corporate sustainability department in 2012. Being unique to the corporate sector, this division is set out to create a robust structural framework for biodiversity conservation at Tata Power.



<sup>1</sup>F&C Asset Management plc (2004). Is Biodiversity a Material Risk for Companies: An Assessment of the Exposure of FTSE Sectors to Biodiversity Risk. ISIS Asset Management: Edinburgh (UK)



# Biodiversity Conservation at Walwhan: Mahseer Conservation Program and Walwhan Garden

## The Business Case

The first hydroelectric power station in India was commissioned in 1915 by Tata Power in Khopoli, an industrial town in the Khalapur taluka, district Raigad, Maharashtra. In 1849, the world famous game fish Mahseer was first recorded in the Indrayani River, close to Raigad district. Mahseer used to be plenty in the Indrayani River and its tributaries were its breeding grounds.

Over a period of time, due to change in land use pattern, deforestation, encroachments and other activities in the vicinity of the river disturbed the breeding ground of this species as it requires clear unpolluted water

for its breeding. In 1970s a declining population of the species was recorded by the Maharashtra Fisheries Department. The National Commission on Agriculture (1976) in its report on fisheries had stated there was a general decline in Mahseer fishery in India. Since the time when Mahseer populations started declining, Tata Power began to study its breeding behaviour and the Mahseer Conservation Program was established in 1970, with an objective to conserve and re-introduce this endangered freshwater fish in Indian rivers.





## Mahseer Conservation Program

The lakes viz. Walwhan, Shirota and Kundli supplying water to the power station are situated in the northern part of the famed Western Ghats. The Mahseer Conservation program was initiated at the Walwhan Lake and has been operating since 1970. The program covers two closely related species, the Deccan Mahseer (*Tor khudree*) and Golden Mahseer (*Tor putitora*). Popularly known as Indian Salmon, these species are an excellent game and food fish that can grow in size up to 1-3 metres. These are reared in a hatchery and introduced into their natural habitats.

Simple breeding and hatchery technology has been developed for production of juvenile fish at the facility. After breeding, the fertilised eggs are kept in the hatchery. The eggs hatch within 72-96 hours depending on the temperature of water. The fries are maintained in the hatchery for 45 days to protect them from any disease and predators. The hatchery has a capacity to develop 500,000 eggs at a time. The healthy

and grown up fries and fingerlings are supplied to various state fisheries departments on their request to release in their natural habitats. The facility at Walwhan is one of the few breeding centres in India which breeds and supplies Mahseer fries and fingerlings to various states, mainly Maharashtra, Karnataka, Punjab, Rajasthan, Andhra Pradesh, Haryana and Assam.

The Mahseer Conservation program has improved Mahseer population not only in the surrounding areas of Walwhan but in other states too. Since agriculture and fishing are the primary occupation in this area, this initiative of Tata Power has contributed to sustain the livelihoods of communities. As a response to the latter, every year around 100,000 fishes of Catla (*Catla catla*), Rohu (*Labeo rohita*) and Mrigal (*Cirrhinus mrigala*) are procured from government fisheries department and released to perennial ponds in the nearby villages. This is to help villagers for a better livelihood.



## Walwhan Garden

Spread over an area of 12.5 acres at the down streams of the dam, the garden is another initiative of Tata Power's conservation efforts near lakes, better known as Walwhan. This garden was also developed during the commissioning of hydro plants mainly to improve the aesthetic environment around Walwhan lake. It provides habitat to over 350 species, including selected medicinal plants and some of endangered tree species from the Western Ghats. The garden is a habitat for nesting of birds due to presence of bushes, trees and availability of food and water as well as it attracts butterflies too.

One of the initiatives at Walwhan garden is the eco-hut project that encompasses design and construction of carbon neutral self-powered eco-houses. The eco-hut, made with an investment of INR 1 million, is completely made of bamboo and its lighting power is supplied through solar panels and windmill. Moving forward, it is showcased as

an example to create an environment-friendly low-cost housing facility at a remote place for recreation in natural surroundings with minimal impact on environment by utilising natural light, solar lighting systems etc.

Besides conservation of fauna and flora, Tata Power continuously creates awareness on protecting not only environment but on biodiversity too among school children, employees and local community. The mass awareness campaign for the conservational activities creates a sense of ownership, making a behavioural change as well as attitude towards owning the area and work with pride for conservation practices. Every year approximately 1500-2000 students of nearby colleges and universities visit the Mahseer facility and Walwhan garden for environmental education programs as well as to see the facility as part of their field excursions.

# Challenges

Though the availability of authentic data on species or genera as well as population trends are the main obstacle to many organisations, Tata Power initiatives on compilation of many studies on the Western Ghats is an example of company's efforts on not only compilation of data but conservation of biodiversity in the region.

The compilation of Birds of Lonavala and Khandala and Orchids of northern Western Ghats are the best examples in this direction. Tata Power regularly discloses biodiversity conservation efforts across the company's operations in sustainability reports too, which are posted on the website.

# Way Forward

Moving forward, Tata Power is committed for sustainable development and to further minimise the impact on environment. Given the nature of the activities of power industry, mainly the impact due to emissions and pollution, Tata Power has installed efficient air pollution control equipment to minimise emission, utilise effluent and sewage after treatment as well as explore various technologies of renewable energy generation. By 2022, the company intends to generate 20-25 per cent of total capacity from non-GHG emitting resources like hydro, solar, wind, geothermal and waste heat recovery options.

Since biodiversity conservation is an ongoing journey at Tata Power, the company is fully committed to continue its biodiversity action plan across locations as well as breeding and hatching of Mahseer fish as the prime concern. The company aims to expand its conservational activities across geographic locations. As is evident that biodiversity is the cornerstone of the existence on earth, Tata Power is committed to preserve this cornerstone and, being one of the few companies in India which is spearheading the connections between biodiversity and sustainable development.

# Contribution to the Aichi Targets



Biodiversity awareness is an integral part at Tata Power to inculcate the need of biodiversity conservation. The relevant information is circulated to all employees across Tata Power Group and its subsidiaries to commemorate special days, e.g. International Tiger Day, Earth Day, World Environment Day, International Wetlands Day, International day for Biodiversity etc. The company aims that each and every one at Tata Power will be made aware on various issues and values of biodiversity and its conservation.

In an endeavour to enhance participatory efforts in biodiversity conservation, Tata Power initiated Citizen Science projects at select locations to enable data gathering on biodiversity as well as increase awareness among its employees for biodiversity conservation.



Suppliers and contractors of Tata Power are subject to Responsible Supply Chain Management (RSCM) policy, which includes energy conservation, environmental management and sustainability awareness program.



Tata Power has installed high efficiency air pollution control equipment to maintain emissions below statutory requirements at all generating stations to minimise pollution which may have an impact on ecosystems and biodiversity. Further, the intent of producing 20-25 per cent by 2022 through renewable sources will further reduce emissions and its impact on biodiversity.



One of the action points which has been taken up as part of the Biodiversity Action Plan for Trombay power plant, Mumbai is to replace invasive plant species with native ones.



The Sea Turtle Monitoring Project has been initiated at Mundra, Gujarat for two species of sea turtles, the Olive Ridley and Green Sea turtle. The study assesses the status of their nesting in the vicinity of plant's outfall channel as to avail long-term data on nesting pattern.

The Mahseer Conservation Program aims to conserve and re-introduce the endangered Mahseer fish in Indian rivers.



Gaushala, a protective shelter for cattle has been established near Mundra plant to supply fodder, either green or dry, throughout the year as a mitigation measure for grazing land. This project has reduced heavy dependency on already parched grazing lands, giving them enough time to regenerate.

Plantation of mangroves in Mundra was taken up in an area of 1000 ha. The benefits deriving from extended mangrove cover range from increased fish catch for local fishermen, reduction in salinity intrusion and protection from natural hazards like storm surges, cyclones and tsunamis.



Since 1979 Tata Power has been working on an Afforestation Program in association with Forest Department, Government of Maharashtra. The program covers around 14,000 ha in the catchment areas of 6 lakes in the Western Ghats, where the company has planted over 18 million trees up to date.

# TVS Motor Company

*TVS Motor Company is the flagship company of the TVS Group. It is the third largest two-wheeler manufacturer in India and among the top ten in the world. TVS Motors (TVSM) business ranges across automobile component manufacturing, components distribution and manufacturing of powered two-wheelers.*

# Relationship to Biodiversity

Quality of human life depends on various factors. Biodiversity ranks high among them. TVSM has taken many initiatives in protecting the environment and biodiversity. Srinivasan Services Trust (SST), the

company's CSR arm, carries out these activities across the 2500 villages that it has adopted. These activities address conservation of ecosystem, afforestation and water conservation.

## The Business Case

TVSM believes that businesses can grow only if the communities are prosperous, healthy and educated. Climate change and environmental degradation can have a serious adverse impact on business. Working for integrated development of communities and protection of biodiversity

helps businesses in social fencing and protection from unforeseen consequences of poverty, social unrest etc. Working for the development of the people and planet gain respect and trust of the government and the people, thus ensuring business to work effectively.



## Srinivasan Services Trust

The company has taken several initiatives viz., women empowerment, poverty alleviation, health, quality education and infrastructure development for integrated and sustainable development.

It is well known that sustainable development depends on conservation of biological diversity, sustainable use of its components and fair and equitable sharing of benefits arising from genetic resources. Therefore, conservation of biodiversity ranks high in the list of CSR activities taken up by TVSM.

Strategy adopted by TVSM for conservation of biodiversity is:

- (1) Afforestation
- (2) Soil and water conservation
- (3) Sustainable use of its components
- (4) Fair and equitable sharing of benefits arising from genetics resources

Effective implementation by TVSM has been possible because it:

- Addresses the underlying causes of biodiversity loss;
- Attempts to reduce the direct pressure on biodiversity and promote sustainable use of the resources;
- Ensures benefits of biodiversity conservation to all who have been adversely affected by the loss of biodiversity.

TVSM has helped develop village forest committees, new watershed models etc. in over 25,000 ha in forest and community lands.



### ► Afforestation

Afforestation in Southern India was identified as a measure to be taken by TVSM with the increasing degradation of the Eastern Ghats resulting in siltation, loss of topsoil and loss of forest cover. The threat of eventual desertification created economic pressure on the communities, which lead to increased crime and social unrest. Thus an urgent need arose to reforest and protect the forests in the Ghats. One of the areas that TVSM has undertaken afforestation work is in Padavedu in Thiruvannamalai district of Tamil Nadu. The afforestation work has been carried out on reserved forest land and on community land. A common feature across all these afforestation work is the involvement of the community.

The reserved forest area in Padavedu had been degraded for many years. About 200 families were dependent on the forest for fuel and for cattle grazing. In 2001, through a joint forest management model, afforestation was undertaken. The first step

however was to discourage the exploitation of the forest by the community, which was done by making them aware of the benefits of preserving it and also by providing loans to forest dependent families to explore alternatives income generating activities.

Under the joint forest management model, the forest department provides the seedlings, TVSM provides awareness workshops and technical assistance and the village community carries out all of the planting. Every village has a Village Forest Committee headed by someone from the community who is responsible for the day to day management and protection of the forest.

Afforestation work has also been carried out on community wasteland in 65 villages which is owned by the panchayat of a village. This wasteland has also degraded because of illicit felling for fuel, grazing and annual fires. With the assistance of TVSM and its partner organisations (such as UNDP and Ernst & Young Foundation), parts of the land have been used to establish a nursery, which is taken care of by the community, and the seedlings from which are planted in the surrounding areas. Here too the planting is carried out by the village community. TVSM also helps them with the maintenance of this community forest and then hands it over to the panchayat after three years. All planting undertaken is of native species.

The afforestation program covers 1,75,380 ha of degraded fallow lands in these 65 villages. Green cover has increased in 1,75,000 ha in reserve forest area and 380 ha in community land. Density of forest has increased from 0.4 to 0.8. Flora and fauna diversity in this area has increased. For example various species of birds have returned to these villages. Increase in the presence of wildlife such as wild boars, spotted deer, common langurs, hares, jackals, slow lorries, monitor lizard, ant eaters etc has been noted.

Bioresources offer also numerous opportunities for ensuring livelihood security and development of biodiversity. These are based on small enterprises taken up in these villages. Some of the examples of enterprises are: furniture from lantana, making arte facts from the village waste like banana plants, honey extraction without seriously damaging the beehives etc. These activities have resulted in significant improvement in income generation for the tribals living in the area. Today, about 5000 kg of honey is collected in these areas. The incomes of tribals have doubled since then. Similarly, making arte facts ensured handsome income for the 250 women, who have been involved in this.



## ► Soil and Water Conservation

TVSM has taken up soil and water conservation in 12,938 ha. TVSM has received support in watershed program from Ford Foundation, ICRISAT, NABARD and Coca-Cola Foundation.

The Padavedu Watershed development project, with Ford Foundation, covers an area of 1147 Ha and was carried out during 2004-2007. The Irumbuli watershed development program with NABARD covered an area of 2482 ha and is still in process. For both projects the main thrust of these programs was on soil and moisture conservation and also aimed to generate income earning opportunities for the local communities.

Several check dams, percolation ponds, farm ponds were constructed and tanks and well were repaired and rehabilitated along with desiltation activities. Plantations were also undertaken in both projects.

Water table in Padavedu area has increased by 10 to 18 feet. Water retention capacity of the soil is also increased. People living in these villages have consequently reaped the financial benefits by getting better yields. In many cases their incomes have doubled in the last five years.

## ► Climate Change

TVSM has planted over 1 million trees. In Padavedu area alone 450,000 trees have been planted. Generally one tree can sequester 0.5 to 1 ton of carbon over a life

span of 25-30 years. Total quantum of carbon is approximately 2,00,000 tonnes of carbon at the rate of 500 kg per tree.

# Challenges

Creating awareness and enabling people to adopt environment friendly practices is a slow process. This needs enormous patience and diligence. TVSM was able to meet the challenges by ensuring that people realise the benefits of afforestation, water

conservation and proper solid and liquid waste management practices. In order to make the effort a sustainable, the challenge is to identify and create a strong and dedicated team of leaders who sincerely believe in the reasons for protecting diversity.

# Way Forward

United Nilgiris Conservation Society, a sister organisation, is now working for enriching biodiversity in Nilgiris district and also working with local community to ensure sustainable development of the effort. Its objectives are:

- Conserve the genetic, species and ecosystem bio-diversity of Nilgiris;
- Protect and maintain the catchments of Bhavani and Moyar river systems;

- Safeguard the rights and needs of primitive tribals and other weaker sections
- Take up ecologically sound developmental activities of villages in Nilgiris;
- Create awareness and mobilise support of masses for conservation oriented initiatives.

This will further enhance the efforts towards sustainable development in Tamil Nadu.

# Contribution to the Aichi Targets



TVSM, through SST, works directly with the farmers and the community in Padavedu to raise awareness about the value of biodiversity and the importance of its preservation.



To address the increasing degradation of SST has worked with the community in Padavedu to set up a Forest Management Committee, headed by the community members themselves to carry out afforestation activities.



A result of the afforestation activities over the years has been the increase in forest cover, the protection of which, and the biodiversity it supports, is the responsibility of the Forest Management Committee.

# WIPRO

*A global IT, consulting and outsourcing company, Wipro employs 145,000 people with 950 clients in 57 countries across 6 continents. The company's business interests span financial services, retail, transportation, manufacturing, healthcare services, energy and utilities, technology, telecom and media. Wipro provides services in consulting, business process outsourcing, business technology services, enterprise application services, infrastructure management, testing, product engineering, engineering design, and product support.*

# Relationship to Biodiversity

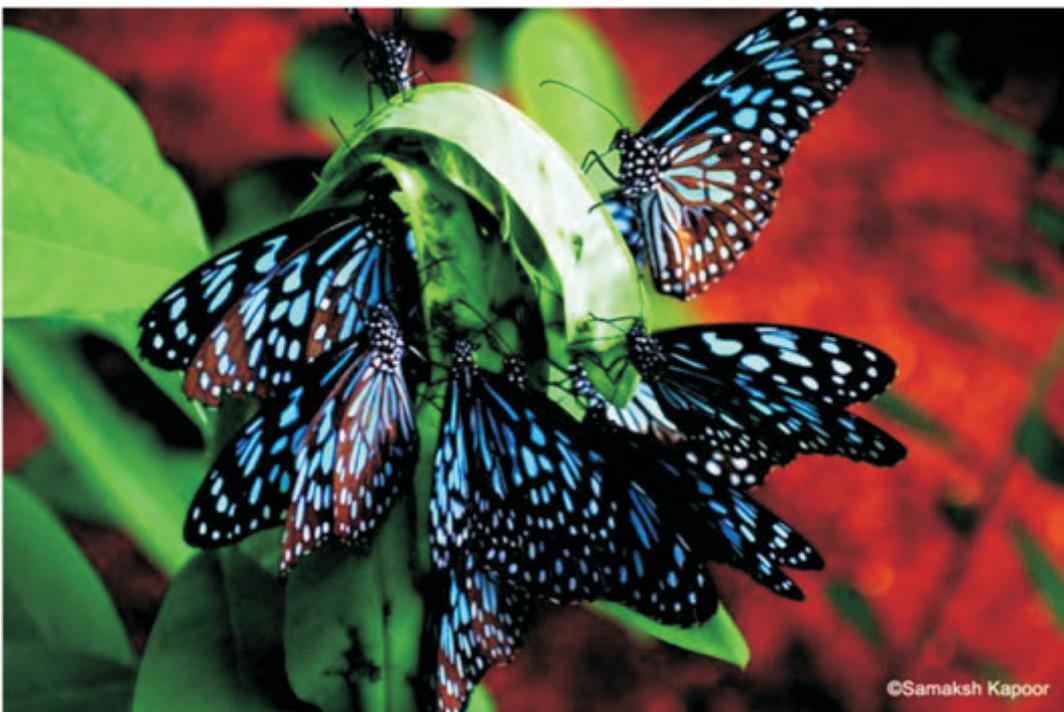
Ecology is one of Wipro's primary areas of engagement - Ecoeye is the program that aims to bring in ecological sustainability perspectives in operations and other key functions of the organisation. Ecoeye focuses on (a) reducing the ecological footprint of its business operations, (b) engagement with employees, supply

chain, partners the wider community with the aim of creating a more sustainable society, and (c) transparent reporting/disclosures. In addition to energy and water efficiency, waste/pollution management, Wipro has also focused on biodiversity, and has set targets for each.

## The Business Case

By Wipro's own admission, biodiversity's connect to business is more intangible as compared to energy efficiency, water conservation and waste management. They followed an integrated approach wherein biodiversity was not only seen for its aesthetic value but as something that in the long term will have a positive impact on and reduces the water and carbon footprint of

the campus, bring the ambient temperature down, improve air quality, reduce use of pesticides, and improve groundwater level. A central part of the program is employee engagement – to create a language for communicating the complex relationships in the natural world and the role as active stewards towards fellow beings.

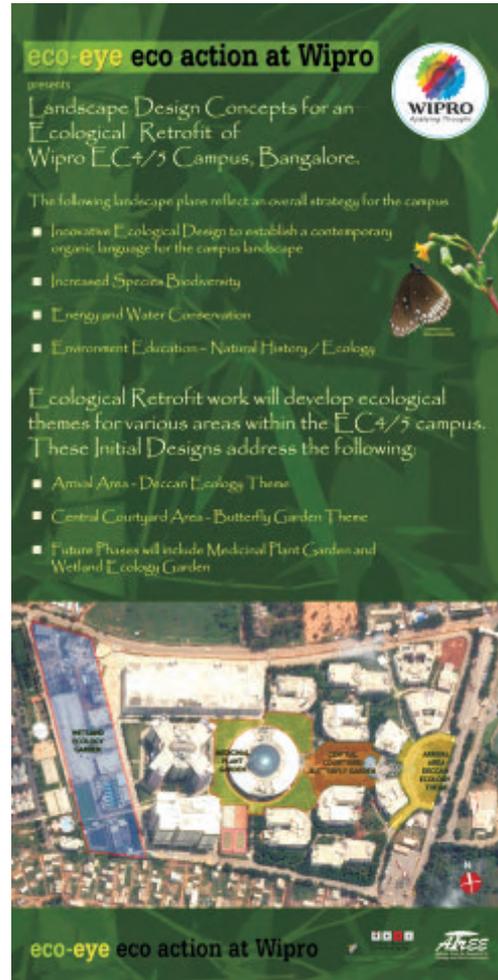


## ECO-EYE

Wipro's first biodiversity project was initiated in Bangalore at its Electronic City Campus in collaboration with Ashoka Trust for Research in Ecology and the Environment (ATREE), a globally renowned biodiversity institution, Idea Design (a specialist architect firm) and Hariyalee Landscapes. ATREE carried out a baseline study to assess the biodiversity, water and carbon footprint of WIPRO's two campuses in Electronic City in Bangalore. The intention was to link the reduction of the campus' water and carbon footprint to a healthy, biodiverse environment. The initiative attempts to retrofit the campuses into biodiversity hotspots/zones.

The first step in the project was to assess the existing plant, birds, butterflies, insects, small mammals and other taxa that were present in the campus and followed by recommendations to increase locally adapted species of biodiversity and it integrated linkages to better water efficiency and conservation, nutrient recycling, reduce cooling needs of some buildings and improve overall aesthetics of the campus. Such an integrated approach is perhaps the first of its kind in India. There are four phases in this project - butterfly garden, wetland park, deccan plateau, and a herbal garden.

The butterfly garden was the pilot project which entailed changing the species composition of carefully selected trees, shrubs and herbs, from exotic to endemic/native trees. The landscape was



redesigned with flowering and fruiting plants and biodiversity-friendly trees being introduced instead of the ornamental, variegated plants and non-native 'sterile' trees. It reduced the use of pesticides, water, and the chlorination of ponds. Efforts were made to retain and transplant trees wherever possible. While this landscape is currently being maintained by an external partner, in-house staff will be trained on how to maintain an ecologically balanced wild garden.

The work on phase two of the project, that is the 3 acre wetland park, has just begun. It will take in excess treated water and through a series of four shallow ponds create a system where the quality of water is further enhanced and at the same time can support a variety of aquatic plants, fish, amphibians and birds. Aquatic plants will on various levels of the pond. The submerged plants, through oxygenating will keep the water clean. Above them will be the floating plants followed by those that come out of the water. The plants have to be carefully selected so that they can be easily maintained and so no plant takes over the pond.

The wetland park is located towards the back of the campus. There is already an existing water storage tank that will be incorporated into the plan. The ponds will be lined water bodies with the source as treated water from the recycling plant. Small islands will be created for birds to nest in as well as perches for them to perch on.

An amphitheatre, watchtower, plaza, and a couple of pavilions will be made for visitors. The plaza will be path with several milestones and markers depicting the evolution timeline that shows the history of life and geology over 600 million years. As one walks along, large stones will have the key moments in evolution explained.

Phase three is the herbal garden which will have medicinal plants. It will be designed such that plants in different sections will correspond to human physiology.

Phase four is the Deccan plateau, which will be created at the entrance of the campus. The designed is such that it recreates a Deccan landscape, with green mounds, big boulders and a mix of native and non-native trees. It will be incorporated with the already existing water fountain and small pool which be filled with non-chlorinated water and aquatic plants. Illustrated granite signages will be put up with information on the natural history of the Deccan.

Given the size of the campus and the number of employees, Wipro saw an opportunity to engage with and involve them, a large part of the reason for the success of its initiatives. To communicate the message of conserving the biodiversity of butterflies, ATREE developed artwork along with the Pitchandikulam Forest Consultants. Massive cuddapah stone were put up with hand-painted content on butterfly families, pollinators, lifecycle of butterflies, and migration of butterflies. There are also pillars which are hand painted and carved to depict life-size images of other wildlife.

ATREE also organised workshops for those on the campus that focused on butterfly and plant interactions and mapping ecological trails. Other workshops included those on



scientific photography, citizen science projects, nature journaling, butterfly plant interactions, tree diversity and bird watching. Wipro plans to make these continuous engagement programs which will build capacity and develop a group of Ecoeye champions that will run a few science projects with ATREE on butterfly monitoring, plant and animal species composition, both within and outside the campus.

On-campus carbon sequestration with the most rapidly growing tree species is not a viable option even when discounting the negative impact of planting just one species and the concomitant water use. Wipro's objective with the landscaping was to enhance biodiversity value, reduce water footprint, and reduce ambient temperature.

## Challenges

One challenge that companies tend to face when introducing such programs is the longer gestation period to see impacts and the indirect or intangible benefits, which are not clearly decipherable for some stakeholders. The other challenges faced were on the execution and logistics level. As retrofitting a campus is much harder than starting from scratch, a lot of work and imagination had to go into incorporating

The butterfly park, the first phase of the initiative is showing positive results. As a result of redesigning of the landscape, it is now a habitat for around 24 species of butterflies and 6 species of moths. For the last two years, it has also witnessed the mass migration of the Danaid butterfly. There have also been an increasing number of Lepidopterans visiting the park.

The actual impact of the entire project will only be apparent a few years down the line as the subsequent phases are completed.

What is commendable is how different fields and creativities – art, architecture, landscaping, construction, ecology, biology, sustainability, corporate – have come to create an ecosystem such as this.

elements within the existing structure and design, as well as decisions' regarding what structures, trees, plants and other landscape features were to be retained and what was to be newly introduced. One of the driving principles in the project is that it is being seen a large experiment of sorts – with the result that the project has integrated continuous learning and feedback in its implementation plans.

# Way Forward

As an organisation with large campuses in urban areas, Wipro has set two primary goals. One, to convert five of their existing campuses to biodiversity zones over a five year period. Two, to integrate biodiversity principles in new campus design which

would include engaging with human resources teams, landscape architects and developers, suppliers of water treatment solutions and other civil infrastructure service providers, etc.

## Contribution to Aichi Biodiversity Targets



### Target 1

Through its Ecoeye programme Wipro is raising awareness amongst its employees, its partners, and the wider community about the importance of biodiversity and its conservation in order to build a sustainable society.

## CASE BRIEFS



# ACC

*ACC, formerly known as the Associated Cement Company was established in 1936. It is a group company of Holcim, which is a Switzerland based global cement producer. At present, ACC operates 17 modern cement factories, more than 50 ready mix concrete plants, 21 sales offices, and several zonal offices. It has a workforce of about 9,500 and a countrywide distribution network of over 9,000 dealers.*



## Relationship to Biodiversity

ACC acknowledges the relevance of biodiversity, as the foremost activity for the cement manufacturer is mining for its prime raw material which is limestone. Mining as an activity has a direct impact on the ecosystem and biodiversity of a region because it involves clearing of vegetation and removal of top soil. The company recognises the need to manage their impact on the environment both to obtain the social

and regulatory consent to operate but also to help build a greener planet. It has adopted a long term Biodiversity Management System (BMS) towards sustainable development.

The BMS was created in collaboration with the IUCN and has a dedicated team working towards minimising biodiversity risks and creating new opportunities.

# Biodiversity Management

## ► Carbon Emissions and Energy Conservation

To reduce its carbon footprint, the company has adopted clinker substitution and energy conservation through use of green energy, alternative fuels and raw materials (AFRs) and waste heat recovery systems (WHRS).

Clinker substitution is found to be the most contributing towards reduction in CO<sub>2</sub> emissions. The company promotes the use of environmentally friendly blended cements that use industrial waste by-products like fly-ash and slag which help conserve limestone resources. Less limestone percentage in blended cement also directly contributes to lowering of CO<sub>2</sub> emissions. ACC's concrete utilises fly ash (a hazardous industrial waste from power plants) to help conserve natural resources and also ensures durability and resistance of structures under extreme climate.

Energy conservation efforts and its subsequent impact on carbon emissions is accomplished by partially substituting virgin coal which is a scarce resource and also an important raw material for the company. One way the company does this is through AFRs. AFRs are basically a wide variety of waste streams that are 'co-processed' (a scientifically proven and environmentally friendly technology) from other industrial sectors like pharmaceuticals, chemicals, automobiles, food and machinery, etc.



These waste streams include paint sludge, effluent treatment plant sludge, chemical waste, expired medicines and FMCG products, biomass including cereal husk and coconut shells and also sorted plastic waste. These AFRs replace the coal requirement and help in reducing the overall CO<sub>2</sub> emission. Also it eliminates the associated CO<sub>2</sub> emission which otherwise would have been generated, if these waste were disposed through incinerators and landfills.

Another way the company reduces its carbon emissions is through the installation of the WHRS. Under this system, the heat released from hot flue gases which is generally released in to the atmosphere is instead channelised to the boilers to generate electricity. At ACC's Gagal plant, the newly installed WHRS is expected to generate 47 mio kWh/annum of power and will also lead directly to a reduction of approximately 44,180 tonnes of CO<sub>2</sub> emissions per annum.

In addition to AFRs and WHRS, the company has also installed three wind farms in Tamil Nadu (TN), Rajasthan (RJ) and Maharashtra (MH). These wind farms have a total capacity of 19 MW and partially cater to the needs of the Madukkarai (TN),

Lakheri (RJ) and Thane (MH) facilities. Installation of wind farms reduces the company dependency on grid power, improves energy security and contributes to the company's Renewable Purchase Obligation (RPOs).

## ► Invasive Species Management

The company has also adopted some measures to manage and limit the growth of invasive species at their sites. For this, mining operations are undertaken in a phased manner and not at a go so as to reduce the growth capacity of invasive species. At some locations, invasive species called *Prosopis juliflora* are uprooted and used for co-processing in the cement kilns. Additionally, the company ensures that during afforestation efforts, the

species of trees are selected with the local forest department to ensure that only local native species are planted.



## ► Pollution Abatement

Typically, the emissions from a cement plant are released in the form of particulate matter (dust), oxides of nitrogen, sulfur dioxide and carbon dioxide. The company maintains regular measurement and monitoring of these emissions through online reporting to regulatory authorities. ACC has also installed continuous ambient air quality monitoring stations at its sites. Additionally, for dust control, measures taken include

conversion of electrostatic precipitators (ESPs) to baghouses, installation of PTFE (Polytetrafluoro-ethylene) membrane bags, use of glass fiber filter bags instead of ordinary filter bags and improved maintenance practices.

Advanced technology and close process controls are used to reduce the nitrogen-oxide emissions.



## ► Water Conservation

The company uses open and unused mine pits for harvesting rain water. The harvested water is then utilised for domestic consumption and for use in the plants. This has helped some plants achieve self-reliance with respect to their water requirements. Water harvesting in mine pits has some additional benefits such as being able to provide water to the local community during dry season and also attracting migratory birds to the area. An example of the company's water harvesting efforts can be found at the ACC plant in Kymore. The impetus to set up a water harvesting system is explained by the topography of the region. There is no major river in the core and buffer zone within a 5 km radius except a few seasonal streams originating from the Kymore range. Additionally, the area is almost flat with a gentle slope towards the

South. In 2012, a project was undertaken to revive a previously built canal by maximizing the recovery of rain water from hills and other seasonal streams and also to connect it to open mine pits which were being used for water harvesting. Other steps included restoration of the desolate Kymore hills through rehabilitation of degraded forests with the help of M.P. Forest Department in a phased manner, plantation and protection of existing flora & fauna and building around 50 check dams spread over 786 ha area of forest range.

The total rain water flowing from the hills is filled up in the old limestone mines pits near the cement plant via 'channels' and 'controlled gates'. These above pits are provided with water pumping stations and pipelines which are laid to the usage points.

## ► Mine Rehabilitation

The company's mine closure activities which includes a rehabilitation process to restore as much of the physical and the biological quality disturbed by mining process. The top soil which is removed during mining is preserved for restoration purposes as it contains nutrients that are vital to the success of the future mine rehabilitation. At the plant level, the company also engages in community projects such as community plantations and distribution of saplings to local villagers with a view to help generate awareness regarding environment concerns in the community.

An example of ACC's rehabilitation efforts can be at the Rajanka Limestone Mines, Chaibasa Plant in Jharkhand. Since 1989,

ACC has afforested 67.04 Ha of mined out land area by planting around 140,000 saplings. Afforestation is generally done by the method of pitting which involves digging of pits of size 45cmx45cmx45cm and with spacing of about 3 metres between adjacent saplings. The pits are filled up with farm manure and good top soil is added which is recovered from fertile areas. Tree species planted are such as Gamhar, Acacia, Sesham, Teak, Albizia, Semal, Siris, Peltophorum, Mahogini, Imli, Neem, Karanj, Jatropha, Mahua, Casuarina, Casia etc. Plantation is carried out every year over back filled area and is being continued at the rate of 2500 trees per Ha. Additionally, about 30 Ha of land was rehabilitated as a water reservoir.

## Way Forward

ACC has adopted a Biodiversity Management System in collaboration with the IUCN. The companies BMS includes the following approaches towards biodiversity conservation:

- Creating awareness regarding biodiversity at all levels of the organisation with focused training being given to all relevant people at each of the plant sites. A customised training module has been developed specifically for the Indian scenario;
- Risk matrices are used for each extraction site to define any potential biodiversity risk

and to take into account the biological importance of the site and the impact of the plants operation on the area. Post classification, biodiversity action plans will be developed first for high risk sites and then for other sites;

- An indicator system is being developed at the Holcim Group level to monitor the impact and effectiveness of ACC's management;
- The complete integration of biodiversity management plan with the rehabilitation plans for each site are yet to be done.

# Ambuja Cements Limited

*Ambuja Cements Limited (ACL), formerly known as Gujarat Ambuja Cements was founded in 1983 and started producing cement in 1986. Since 2006, ACL has been a group company of the Switzerland based global cement producer Holcim Limited. The company has significant footprints across western, eastern and northern parts of India and primarily supplies Ordinary Portland Cement (OPC) and Pozzolana Portland Cement (PPC).*

# Relationship to Biodiversity

Cement production as an activity can adversely impact the surrounding environment, especially if the operations are not facilitated with preventive and corrective steps. Thus, Holcim, which is the parent company of ACL, adheres to a strict biodiversity directive that requires all its group companies to create and follow a biodiversity action plan (BAP). In addition to identifying and addressing the biodiversity and environment conservation concerns, BAP also includes regular assessments of the conservation initiatives, which are performed by established third party assessors.

ACL has five integrated cement manufacturing plants, eight cement grinding units and ten operating limestone mines across the country. The area surrounding the plant sites range from the coastal areas to the Gir forest wildlife sanctuary and National Park but majority of the surrounding areas fall under the category of productive agricultural land. Thus, rehabilitation of used land in order to maintain its productivity is a focus area.

## Biodiversity Management

ACL has adopted various environment friendly practices which are implemented across its plants at different intensities based on the sustainability requirements of their respective surrounding areas.

At the sites and quarries, where limestone extraction takes place for the purpose of cement production, planning and development is largely focused on the post-extraction rehabilitation period. For instance, in the case of the Ambujanagar mining site, environment-friendly surface-miners are used that are more like sand/gravel mining than the blasting procedure that is generally associated with limestone mining. These mining areas are

divided into small plots and thus accumulate only a few metres in depth of limestone deposits. This way individual mining plots are exhausted relatively quickly and made immediately available for rehabilitation. While no blasting takes place in Ambujanagar, other sites boast of only controlled blasting. These sites are Darlaghat, Chandrapur, Bhatapara and Rabriyawas.



The company also aims at mitigating climate change effects by adopting better technology in its operations. Waste management is made more effective by employing waste dump stabilisation through coir matting on mine dump slopes.

Controlled and efficient transportation operations from mines to plants offer a large scope to reduce GHG emissions and their adverse environmental impact. ACL attempts to seize this opportunity by adopting eco-friendly techniques such as covered belt conveyor for limestone transportation from mines to plant (this is extensively used in Himachal Pradesh), use of sea transport (5 sea-terminals) wherever possible, mechanised/covered vehicles for material transport. At the Darlaghat plant, Covered Overland Belt Conveyor is used for directly carrying raw materials from mines to the plant, therefore avoiding the use of road transportation and the resulting emissions.

In addition to reducing the negative effects of the plants, steps are also taken to improve the quality of the surrounding environment. This is achieved by developing plantations and nurseries around its plant sites, promotion of sustainable agriculture through organic farming, better cotton initiative and systematic rice intensification methods. ACL also invests in composting/vermicomposting (largely in Ambujanagar, Maratha, Ropar) to help develop the green belt areas.

The water management initiatives taken by the company are designed based on the requirements of the local ecology. Since many of the company's operations are



located in semi-arid regions, the plant sites are mostly water stressed. Similarly, water management is also needed in the coastal areas where the Ambujanagar plant is situated. This is because the water resources are intimately linked and the area is prone to salinity in gression. In both cases, the expert panel observed effective techniques of water management such as use of mine pits, reservoir water bodies, check dams and a system of channel flows.

As per the requirements of Holcim's Biodiversity directive, ACL invited an expert panel from the International Union for Conservation of Nature (IUCN) in November 2012 to observe the biodiversity at Ambujanagar. The panel made the following observations about the initiatives and their impacts at the site and its surroundings.

Rehabilitation efforts post land use is an integral part of the mining operations and are regularly supervised and checked by the licensing authorities. At Ambujanagar, most areas are returned to some form of agricultural use, hence the plant species used are either annual or perennial crops or trees for fruits and fuel wood.

The expert panel observed that, 'the company is promoting innovative approach for rehabilitation and compensation for the land surrendered by the farmers for mining (Land for Land). This involves taking the fertile top soil from mines such as Singar and using them with additional soil enrichment measures to rehabilitate areas of another mine. Demonstration plots are used to encourage farmers who are compensated for the land they have lost from other mines.'

The impact of the water management techniques used by the company at its various sites have resulted in improved conditions of local flora and fauna. The mine pits used in the semi-arid regions are being used for water storage and this positively contributes to habitat quality, crop/plant biodiversity and in attracting migratory birds to the area. Reservoir water bodies are also created which benefit the local farming operations and also help in the rehabilitation of the land used for mining. In the coastal areas, the setting-up of check dams, water reservoir pits, and a system of channels allows the re-direction of water between different areas. This helps in local farming practices and is also important for pushing back the saline freshwater interface towards the coast, thereby reversing the previous saline in gression.

The water reservoirs also positively impact the local fauna. At the Sugala mine, where several water bodies have been created as a part of the rehabilitation strategy, one can find a wide variety of resident and migratory water bird species like spoonbills, painted

storks, black and black-headed ibis, as well as pheasant-tailed jacana, green shank, black winged stilt, and snipe. Whilst not falling into strict endangered categories, the wide variety of species is indicative of the potential for a positive biodiversity impact of these quarries after mining has been completed.

The company has also made some additional conservation efforts at the Ambujanagar plant such as developing 15 Ha of mangrove plantation, construction of parapet walls around open well in villages which act like traps for wild animals which stray out of Gir forest and also support conservation of whale sharks, sea turtles and coral reef.

As a part of its annual Plant Environment Profile and due to the advanced regulations advocated by the Indian Bureau of Mining, the IUCN have observed that good biodiversity related information is available for the Ambujanagar plant. Based on the information, the expert panel has noted that given the size of the area and the high opportunity cost to the local farmers, the land is more suitable for agricultural purposes rather than focused long-term conservation efforts. However, in addition to the primary goal of agriculture, a secondary



biodiversity objective should be pursued, in a way that doesn't impact the primary objective. For example, shaping and planting of ponds created for agricultural use in a way that will also benefit the breeding of wintering birds or other forms of

wildlife and further, by planting of trees and shrubs along boundaries of the fields and earth banks such that they contribute to local biodiversity (such as providing food and shelter for insects, birds and small mammals).

## Way Forward

Based on the recommendations made by the expert panel members of the IUCN, ACL initiated a biodiversity assessment plan in 2013 with the Gujarat Institute of Desert Ecology. The aim for this biodiversity assessment was to prepare a complete BAP. The duration of the assessment was five months and it has recently completed its final draft report. In the coming 2-3 years the

company plans to conduct similar assessments and create a BAP for all of its integrated cement plants having mining sites. BAP will form a basis of management of biodiversity. Additionally, ACL has also finalised a Wildlife Conservation Plan (WLCP) for Darlaghat in Himachal Pradesh in 2013.

# Bajaj Group

*Bajaj Hindustan Limited was established in 1931 by Kamalnayan Jamnalal Bajaj. At the time of its inception, the company was primarily involved with developing the sugar industry in India. However, over the years the Bajaj Group has diversified to include the growing infrastructure sectors such as power, coal mining, real estate, FMCG and ethanol, etc.*

# Relationship to Biodiversity

The company's corporate philosophy recognises the deep inter-linkages between nature and the socio-economic development of society. Industrial operations and human actions often result in the misuse of natural resources and degradation of the local biodiversity and leadsto poverty and backwardness. This happens because loss of biodiversity leads to disturbances and the ecosystems are no longer able to service the social needs and this adversely impacts the livelihood opportunities, income and migration. Other than the social needs, loss of biodiversity also impacts the food chain and subsequently the health and nutrition status of the population. Hence, the company stresses upon the importance of adopting farming and agriculture techniques that have minimum impact on the local flora and fauna.

In order to fulfil its corporate social responsibility, the company set up the 'Kamalnayan Jamnalal Bajaj Foundation (KJBF). The foundation endeavours to improve the social and economic development indicators of the country and has adopted a participatory approach towards this end. KJBF believes that tremendous potential for growth and development is realised when the rural communities are empowered to efficiently use human and natural resources.

The KJBF has various projects active in 554 villages of the Wardha district. These are two-pronged projects as they address the problems faced by the farmers while also working towards preserving the biodiversity of the farm ecosystem

# Water Resource Development

Soil erosion caused due to run-off water is a matter of concern as the land loses the fertile top-layer of soil. In addition to fertility loss and diminishing land usability, the water storage capacity of the water reservoirs is adversely affected by the 'silting-up' of water reservoirs by the deposit of eroded material. Another concern regarding water is the inability of the farmers to irrigate their lands due to shortage of water, this issue gets highlighted during the 'Rabi' season, when the water demand is on an all-time high. To address these issues, in consultation with the local community, KJBF has identified and undertaken various water resource development measures such as rejuvenation of silted-up water bodies, construction of water harvesting structures and farm bunding.

Under the umbrella of KJBF's development projects, 82 rivers/streams have been rejuvenated in the 120.23 km area which has prevented 8547 acres of land from water clogging. Water harvesting measures include construction of 70 check dams, 1858 farm ponds, 177 group wells, 1609 recharging wells and bores, 799 Bori Bandhs and 17 percolation tanks. Up to 60 per cent of water used during irrigation is saved by the installing 442 drip irrigation systems, 1634 sprinkler irrigation systems,



969 lift irrigation systems and 2900 water storage tanks. Farm Bunding is an effective technique employed by KJBF to prevent soil erosion. The foundation has installed 18 gabion structures and 568 loose boulders which benefitted 27426 farmers and 69278 acres of land under the water resource development programme. As a result of these interventions water flows in the streams have increased from four to eight months, the average water level in the wells has risen by 8 to 12 feet and availability of water has increased area under cultivation, improved cropping intensity and cropping pattern, increased yield by 40 per cent and income by 30 per cent, besides creating employment opportunities.

Pollution and siltation lead to the degeneration of the freshwater bodies which are home to a number of floral and faunal species. With the rejuvenation of rivers and streams as a result of KJBF's interventions, the quality of water has improved as has the oxygen content, making it conducive for the growth of flora and fauna. Rainwater harvesting has led to an increase in the water table. Water is also able to percolate in the soil and conserve more moisture thus helping the growth of microbes.



# Promoting Sustainable Agriculture Practices

The farmers of Wardha are extremely vulnerable to starvation and poverty. Their vulnerability arises due to their heavy dependency on agriculture, the quality of which is conditional on erratic climate change, limited supply of water for irrigation, poor awareness about modern technology and outdated farming techniques. In order to address the issues of mono-cropping, food security, lack of alternative livelihood opportunities, vicious loan circles involving informal lenders and unsustainable use of chemical pesticides and fertilizers, KJBF has intervened to make farming more economical and sustainable by implementing agriculture based projects. Some of these projects are:

- Convergence of Agricultural Interventions in Maharashtra's (CAIM): The focus of this intervention is to maintain the natural biodiversity of the farm ecosystem. Under this project, the farmers are motivated to adopt integrated pest and nutrient



management. State agriculture workshops on organic farming that have been organised in coordination with the state government has helped create crop-specific groups of farmers and has helped improve the fertility and micro-flora of the soil. Additionally, LEISA technology has been implemented which has helped reduce the costs of production.

- WADI Project: This project simultaneously aims to expand the livelihood opportunities available to the local tribal population and thus reduces the pressure on the forests for fuel wood that leads to the destruction of the forest area. This project also includes implementing water and soil conservation efforts that minimises biological risks and restores denuded land.
- The foundation has undertaken many awareness programmes that seek to promote 'Natural Farming'. Natural farming considers the medium- and long-term effect of agricultural interventions on the agro-ecosystem. It aims to produce healthy food while establishing an ecological balance to prevent soil fertility or pest problems.
- Better Cotton Initiative is implemented in 112 villages and help to reduce 15 per cent of the cost of production by minimising doses of chemical fertilizers, pesticides and insecticides.

- Organic Cotton farming: Implemented in 30 villages as a one acre model which helps in reducing the utilisation of chemical fertilizers, pesticides and insecticides.

Soil building practices such as crop rotations, inter-cropping, symbiotic associations, cover crops, organic fertilizers and minimum tillage are central to organic practices. These encourage soil fauna and flora, improving soil formation and structure and creating more stable systems. In turn, nutrient and energy cycling is increased and the retentive abilities of the soil for nutrients and water are enhanced, compensating for the non-use of mineral fertilizers. Such management techniques also play an important role in soil erosion control. The length of time that the soil is exposed to erosive forces is decreased, soil biodiversity is increased, and nutrient losses are reduced, helping to maintain and enhance soil productivity.

Natural farming reduces non-renewable energy use by decreasing agrochemical needs. Organic agriculture contributes to mitigating the greenhouse effect and global warming through its ability to sequester

carbon in the soil. Many management practices used by organic agriculture (e.g. minimum tillage, returning crop residues to the soil, the use of cover crops and rotations, and the greater integration of nitrogen-fixing legumes), increase the return of carbon to the soil, raising productivity and favouring carbon storage.

KJBF promotes indigenous seeds which is more suitable to the area which helps to maintain genes. At the species level, diverse combinations of plants and animals optimise nutrient and energy cycling for agricultural production. At the ecosystem level, the maintenance of natural areas within and around organic fields and absence of chemical inputs create suitable habitats for wildlife. Lack of pesticides use at the farm level attracts the beneficial species on the farm land which act as friend insects for the farmers. Birds act as natural pollinators and pest predators.

The awareness programmes have succeeded in involving 2468 farmers, of which 830 farmers have adopted these methods in about 1163 acres.

# Promotion of Biogas

KJBF is making efforts towards promoting biogas in Wardha in order to reduce the dependency on forests for fuel wood. Till date 1270 biogas plants have been constructed in the district. Biogas is a cleaner, greener and healthier alternative to fuel wood. Additionally, the use of biogas slurry as manure is promoted as it increases agricultural productivity.

The forest cover in Wardha is spread over 1019 sq. km. of land which constitutes

15.40 per cent of its total geographical area under the Forest. Major parts of the forest is in Arvi, Karanja, Ashti, Wardha and Seloo tehsil at North part of the district. As per the Forest Department, due to illicit trading of fuel wood, the area under forest has been falling (1,54,664 cubic metre area in 2008-2009 to 1,18,453 cubic metre area in 2010-2011). However, with the adoption of biogas, the dependency on fuel wood has gone down drastically.



# Design for Change (DFC) Programme

Under the DFC programme, KJBF has made efforts to involve school children in identifying and spreading awareness about biodiversity and nature concerns. The programme follows the Feel, Imagine, Do and Share approach to help students solve the problems that they have identified in their immediate vicinity.

For instance, the students arranged for grain and water in earthen bowls for the local bird population which was dying out due to shortage of water and grains in the urban area.



## Way Forward

Presently, KJBF's sole focus has been in the Wardha district but the foundation aims to expand its activities to the Vidarbha region by 2020. The company's long-term biodiversity plan includes identification of activities for sustainable growth and biodiversity enhancement. These include (i) setting up of seed banks that encourage the poor and marginally poor farmers to enhance their livelihood security through

conservation of indigenous genetic resources and promotion natural farming techniques, (ii) promotion of crop diversification, (iii) promotion of natural farming on a large scale as it is one of the simple techniques for biodiversity maintenance in farmlands, (iv) promotion of renewable energy by setting up of solar pumps and biogas plants and (v) promotion of farm bunding on a large scale.

# Biodiversity Conservation India Limited

*Biodiversity Conservation India Limited (BCIL) is a Sustainable Built Environment (SBE) enterprise set up in 1994. The objective of BCIL, from inception, has remained unchanged - to mainstream urban sustainability. The company endeavours to create urban living development models that ensure growth and productivity without compromising on environment sustainability and natural resource efficiency. BCIL has identified old and new technologies which exist within the domains of building, water and energy management that are both financially viable as well as sensitive to resource consumption.*

# Relationship to Biodiversity

The ecological relevance of BCIL's focus on creating 'Green' housing complexes arises from the acknowledgement that with growing population, housing will see a 3-time rise in the quantum of homes built. The company is attempting to address the growing need for housing units i.e. 44 million housing units according to the Indian Government. Thus, creation of housing projects without risk to environment and to resource depletion will make a big difference to conserving the natural balance of the environment.

Through its zero energy buildings, BCIL has made sustainability and biodiversity

conservation a part of both its operations (how the resources are used and managed during the construction of the houses) and its final product (the green buildings themselves). In order to achieve compatibility between revenue generation and resource use efficiency. In its business models, the company stresses on innovation and incubation of green technologies. Additionally, the company stresses on four factors which are the critical considerations of its sustainable built environment operations namely, environmental compatibility, economic efficiency, endogeneity and equity.



# Sustainable Built Environment

Under its Sustainable Built Environment (SBE) initiative, BCIL has developed and operates various green housing complexes. Examples of its SBE initiative are Zed Collective, Zed Woods, Zed Earth and TZED Homes. These are located in Bangalore while one ZED project is coming up in Chennai.

They are all built on the ZED (or zero energy development) principles of sustainable resource management. The ZED campuses are developed with a built-in and

customised structure that requires minimum day-to-day management and which is environmentally friendly because the energy consumption due to daily utilities is maintained at a bare minimum. These utilities range from zero electricity fridge-freezers, fully controlled air-conditioning based on 100 per cent fresh air, and built-in energy-efficient lights which ensure that the comfort level and market value of the product is not compromised even as energy consumption levels are brought down.





Energy efficiency is achieved on the campus by the use of new and old technologies such as the following:

### ▶ Air Conditioning Systems

To keep homes dust-free and cool, the campus uses energy-efficient appliances such as earth tunnel venting systems, nocturnal cooling systems, or the stack effect, which draws ambient air and cools it by convection.

### ▶ Lighting System

Intelligent lighting systems that are a blend of motion sensors, ambient light sensors and timers are used to ensure that lights are utilised conservatively. Power consumption is reduced by 80 per cent due to the use of compact fluorescent lamps and light emitting diodes.

### ▶ Ventilation

Inside the washrooms both the AC and DC fans are used for ventilation. These fans are noiseless and energy efficient. DC fans are

powered by photovoltaic panels and run from dawn to dusk, while AC fans can be switched on and off as needed.

### ▶ Green Architecture

**1. External wall infrastructure** - The walls are built using soil-stabilised blocks, laterite blocks and surface engineering with stone chop plastered surfaces. This ensures that surfaces are non-erodible, need no external paint applications, and are thermally efficient.

**2. Green roofs or 'sky gardens'** - These provide a planting space for every home while serving as thermal insulation for adjoining and lower-built spaces. Each sky garden uses lightweight mulch and coir pith instead of heavier soil, and is irrigated via a drip method. This promotes urban agriculture and encourages organic vegetation.

**3. Woodwork** - Non-forest timber and composite woods are used for frames and shutters. These materials are superior in quality, offer fine finishes, and use less energy to produce, thus reducing carbon emissions

## ► Water Supply

The water supply system is self-sufficient and uses rainwater collected from the roof and stored in shallow aquifers with a series of micro wells, drains, percolation pits, and trenches. Trenches are shallow at ten metres, so ground water is not depleted. Water treatment costs are reduced via direct tapping of rooftop rainwater.

## ► Conscience Meters

Meters are placed that keep a check on the electricity and water consumption levels. As the number of electrical devices increases, so does power consumption. An electric watt meter fitted in each home indicates the wattage used at a particular time and thus allows users to monitor their power consumption and introduce efficiencies. Meters on the kitchen and bathroom taps help to monitor the volume of water used in litres.

Due to the measures that are undertaken both during the construction of the housing units and then again post occupancy, the environment impact is significantly reduced. There is reduced dependence on the civic grid for electricity as 70 per cent of it is generated using the solar panels. The hollow cement blocks used by the company for construction weigh 18 kgs as against the average 35 kgs and this means that about 85,000 kgs of materials is being saved. Due to ingenious plumbing techniques, the litres per use of water has been reduced from 12/14 litres to 2/4 litres and this action saves 105,000 litres of water per year per household. These sustainable housing units achieve 30 per cent reduction in consumption of energy post occupancy, 20 per cent reduction in consumption of energy during construction and 50 per cent reduction in demand for fresh water.





## Way Forward

Currently zero energy enclaves under way are ZedEarth in the busy north Bangalore region hosting 150 homes that are free from the grid for energy, water and waste, and ZedRia offering 425 homes in Chennai's busy IT corridor of OMR. BCIL is gearing up to launch two million sq.ft. of new ZED

homes – that is a thousand more such energy-efficient homes. The BCIL group is also set to launch energy initiatives that will increase consumer awareness in cities. Under the BCIL Altech Foundation a series of training programs and energy advisory are being formulated.

# Godrej & Boyce Mfg. Co. Ltd.

*The Godrej Group was founded by Ardeshir Godrej in 1897 and at the time the company was primarily a manufacturer of high quality locks. Today, the group consists of seven companies that are present in diverse sectors such as real estate, FMCG, industrial engineering, appliances, furniture, security and agri-care. The company also has grown in its global presence as currently 26 per cent of its business is conducted overseas and across 60 different countries. The group's headquarters are located in the industrial garden township called Pirojshanagar in the suburbs of Mumbai, Maharashtra.*

*Out of the seven companies under the Godrej group, Godrej & Boyce Mfg. Co. Ltd., which is the holding company of the Godrej group has 15 business divisions offering consumer, office and industrial products and services.*

# Relationship to Biodiversity

Godrej & Boyce Mfg. Co. Ltd. has a trust that invests 25 per cent of its shares back in to the environment, healthcare and education sectors. This is reflective of the company's corporate policy towards sustainable development and biodiversity conservation in particular. This is further reinforced by the long-term and continued association with various projects and NGOs working in the area of biodiversity conservation. Specifically, WWF-India, a prominent conservation NGO has been closely linked to the Godrej name since the late S. P. Godrej who was its Founder trustee and President. Over the years, WWF-India has expanded its focus from wildlife conservation to include conservation

of habitats and ecosystems and to lend support to the management of the country's protected area network. The company is also associated with TRAFFIC-India (Trade Record Analysis of Flora and Fauna in Commerce), a division of WWF-India, which is responsible for monitoring and studying legal and illegal trade in wildlife and its derivatives, in a way contributing to the enforcement aspects of bio-diversity conservation. Another initiative to which the Godrej name is attached to is the National Society of the Friends of Trees that maintains a knowledge bank on species of trees and supports afforestation efforts by freely distributing saplings.

# Mangroves of Soonabai Pirojsha Godrej Marine Ecology Park

By an indenture dated 30th July 1948, the ownership of the entire village of Vikhroli belongs to Godrej & Boyce. This land expands over approximately 1500 ha of land and includes a large patch of khajan (or Khazan: saline flood plains or low lands situated near creeks) land with luxuriant mangroves along the Eastern boundary skirting the Thane Creek. The land was set to be developed as an industrial garden township to expand the company's horizons. However, given the highly sensitive ecosystem of the area, the company decided to undertake measures to conserve the biodiversity and strike a delicate balance between industrial operations and nature conservation. Thus, the Soonabai Pirojsha Godrej Marine Ecology Centre was set up in Pirojshanagar, Vikhroli, and 750 ha of land was brought

under reservation. The project followed a three pronged approach of research, conservation and education so as to help rejuvenate the mangroves in this area.

Through conservation measures and regular monitoring initiatives, the Ecology Centre has maintained the intricate ecological balance of the land. Through research initiatives, the centre has engaged in the propagation of various species of Mangroves, developing theme parks on medicinal plants and rare endemic plant species, palms amongst others. For instance, the Plantation Programme launched by the Foundation has seen the reintroduction of an extinct mangrove species like *Rhizophora* that had disappeared from the Vikhroli area. Conservation and ecological restoration of



degraded mangroves is carried out by raising saplings in nurseries and replenishing degraded mangrove areas through artificial regeneration in different areas. Education is used as a means to disseminate information regarding the importance of mangrove conservation and is carried out by the Mangrove Interpretation Centre through film/slide shows, seminars, nature trails/camps, poster exhibitions etc. The centre also involves students and nature enthusiasts in programmes that educate them about control and cause of degradation of the mangroves areas, preparation of an inventory of species of flora and fauna in the area, taxonomy survey of the area, standardisation of techniques of afforestation, ecological and social assessment of mangrove ecosystems. Due to such research plantations have been successfully carried out in about 100 acres of saline blank area.

As a result of the education and research initiatives carried out by the centre, every year around 5000 visitors of diverse backgrounds learn about the biodiversity in the mangroves, the threats it faces and the importance of its importance for mankind through various mediums. The impact of



such initiatives on the faunal and floral biodiversity of the area is evident from the large numbers of different species found in the area.

Overall, there are 206 species of birds, 33 species of reptiles, 30 species of spiders, 23 species of fish, 15 species of crabs, 8 species of prawns and 12 species of mammals that have been identified in the area. Major bird species of the area are White Bellied Sea Eagle, Greater Flamingo, Lesser Flamingo, Brahminy Kite, Osprey, Marsh Harrier, Buzzards, Black Kite, White Cheeked Bulbul etc. Additionally, the wetland acts as an important stopover for over hundred species of migratory birds including magnificent flamingos, gulls, terns, avocets and curlews. Another indication of the healthy ecosystem is the 82 species of butterflies that have been identified in the region. Mammals like jackals and mongoose also were sited many a times. Compared to 15 years ago, it has been recorded that there has been an increase of 26 species of birds, 3 species of reptiles, 2 species of crabs in faunal biodiversity and 28 species of trees, 10 species of shrubs, 14 species of palms, 18 species of ferns in floral biodiversity.

The mangrove fauna could also be classified

as a) aquatic, b) semi aquatic and c) terrestrial.

The marine faunal biodiversity recorded here include 23 species of fish, 15 species of crabs, 8 species of prawns and numerous molluscs. The terrestrial fauna logged so far include 206 species of birds, 33 species of reptiles, 30 species of spiders, 12 species of mammals and over 82 different species of butterflies. The important mammalian species found here are the Jungle Cat, Asiatic Jackal, Wild Boar, Indian Mongoose and various species of bats. The reptilian fauna is vivid and main species are Cobra, Krait, Russell's viper,

Rat Snake, Rock Python, Indian Monitor Lizard, Dog-faced Water Snake, Wart Snake, Common Skink, Snake Skink, Garden lizard etc.



## Way Forward

Currently, the Godrej team is working on developing a biodiversity index for Pirojshanagar to assess the changes that has happened over the years in the biodiversity of the area. The Singapore city biodiversity index model is being used for this evaluation and will also help in

understanding the impact the conservation activities have had on native biodiversity. Additionally this initiative will serve as a baseline for taking up new programs and focusing on specific areas which need more improvements as against other well developed areas.

# Jain Irrigation

*A family-owned business founded in 1963, Jain Irrigation Systems Ltd is an integrated agri-business that is known to be one of the top manufacturers in micro irrigation systems worldwide – a segment that accounts for about half of company's revenue. Besides a range of drip and sprinkle irrigation systems, the company provides plastic pipes and sheets, agro-processed products, tissue culture plants, renewable energy solutions, financial services and other agricultural inputs.*

*Jain Irrigation is headquartered in Jalgaon, Maharashtra, where besides production facilities the R&D, demonstration and training centre, tissue culture and agri-biotech lab are situated. Other manufacturing facilities are located at Kondamadugu and Chittoor (Andhra Pradesh), Udumalpeth (Tamil Nadu), Bhavnagar and Baroda (Gujarat) and Alwar (Rajasthan). Over the years significant international presence has been attained with production facilities in the Middle East, Europe, Australia, Central and South America, and the United States.*

# Relationship to Biodiversity

Being an agri-business company, Jain Irrigation has direct interfaces with biodiversity and ecosystem services. As the water crisis across the world intensifies, products and processes that address water scarcity are imperative. Expanding global population, economic development and increasing demand for energy is expected to lead to water scarcity for 30-40 percent of the world by 2020 and if business as usual continues, there will be no freshwater by 2040 (CAN, 2014)<sup>1</sup>.

For Jain Irrigation preservation of biodiversity is aligned with its business objectives, since each product is defined to be an outcome of efforts to conserve natural resources through substitution or value addition. Being an organisation with social commitment, employees at Jain Irrigation are motivated to work for sustainability of farmer, the business and environment.

## Initiatives (Jalgaon)

### Products of Jain Irrigation

Pioneering the use of micro irrigation in the country, Jain Irrigation has far-reaching positive impacts on biodiversity by optimising the use of water, hence using the resources sustainably. Drip irrigation saves water and increases the productivity of land. Compared to the traditional flood-based irrigation, these systems enable farmers to use half as much water and fertilizer as well as less electricity.

The first innovation at the R&D lab was banana tissue culture. Conventionally, a banana plant used to take about 12-18 months to grow and to bear about 12-15 kilograms of fruit. With the help of tissue culture, a banana plant takes only 11-12 months to grow and bears about 25-30

kilograms of fruit in its lifetime. Above and beyond higher yield, tissue culture banana crop's water requirement is drastically reduced by around 3.5 times. Moreover, the energy use is reduced around 2 times. For a water-intensive crop like banana, these conservation gains amount to substantial saving of finite resources. Pomegranate is one more crop that is raised with the help of tissue culture.

Another product by Jain Irrigation is solar pump that helps to save natural resources and reduce impact on climate change by cutting GHG emissions. Solar water pumping is seen to be ground-breaking for the rural agriculture and to transform the lives of many farmers.

<sup>1</sup>Aarhus University (2014). Worldwide Water Shortage by 2040. Retrieved August 15, 2014 from [www.sciencedaily.com/releases/2014/07/140729093112.htm](http://www.sciencedaily.com/releases/2014/07/140729093112.htm).

## Jain Hill and Jain Valley

In 1988 the work began on barren land conversion into cultivable land. The land which was supporting less life and biomass was turned into green lush area to support biodiversity. In the process, the invasive specie *Glericidia* was totally removed from the site and aggressive spread of *Lantana Camera* was restricted. Jain Watershed project was taken up, involving land and water conservation along with rainwater harvesting. Besides, a forest area of 35 acres at the bottom of the valley is naturally



preserved. As a response to conservation efforts undertaken at the Jain Hill and Valley, this site has become home to a variety of bird and animal species by providing them shelter.

In 2010 biodiversity conservation program was initiated, comprising of indexing of the area. A total of 135 species were recorded in the area, including 42 trees, 10 shrubs, 41 herbs and climbers, 1 woody climber and 10 grasses. 20 mammals and 95 bird species were also found at the site.



## Jain GAP and IPM

The Jain Good Agricultural Practices (GAP), an adopted version of the Global GAP standard for certifying agricultural products, has been developed by the company. This localised standard is also benchmarked against the Sustainable Agriculture Code of Unilever. The objective of Jain GAP is to ensure that farmers utilise prescribed good agricultural practices for sustainable productivity enhancement. Among other parameters, biodiversity conservation is one of the aspects audited under the Jain GAP. Today, around 3000 farmers from around Jalgaon are certified under the Jain GAP for onion, banana and mango crops.

Apart from certification, Jain Irrigation is creating greater awareness on integrated pest management (IPM) practices among its farmer community. Traditionally, farmers use solely chemical pesticides to control the pest, which leads to environmental contamination and resistance in pest, whereby the latter gives rise to higher doses of chemical that is further detrimental for flora and fauna. On that account, IPM offers a range of solutions from prophylactic to curative methods that minimise the use of chemical pesticides, thus conserving ecosystems and maintaining ecological balance.



## Way Forward

Having implemented biodiversity action plan on the main site of 600 acres, same approach is to be taken on the newly acquired nearby area. A native biodiversity

theme park is planned ahead to be established at Jalgaon under the biodiversity conservation program.

# Mahindra Lifespaces

*The Mahindra Group is a diversified Indian multinational that is present in over 100 countries and employs over 1,80,000 people. Mahindra Lifespace Developers is the real estate and infrastructure development arm of the group. The company's operations are in the residential and large format developments space offering multi-family and single family homes across India and in integrated business cities such as Chennai and Jaipur.*

*As a part of their mission statement and strategic intent, they have adopted a triple bottom-line approach which focuses on people, planet and profits.*

# Relationship to Biodiversity

Mahindra Lifespaces has identified biodiversity as one of the key material issues within its real estate projects. The company primarily works on residential projects and world city business projects. Residential projects are located largely in urban areas. Hence, there is limited proximity to high biodiversity zones. However, any instances of risk towards biodiversity are managed through environment management, approvals and sustainability agendas.

As part of the process of materiality identification, biodiversity was identified by the company as one of the long term risks more linked to integrated business cities. They believe that they take steps that have a positive impact on biodiversity it can translate as a key risk to the industry as well as the company. Thus, in the case of world city business projects, an environment impact assessment is conducted to assess presence of any risk towards biodiversity and action is taken to protect and enhance biodiversity in and around the site.

Mahindra Lifespaces is the only real estate company to disclose non-financial performance through GRI reporting. The sustainability roadmap developed for the company has identified actions towards biodiversity management. Efforts have been incorporated at various links of the chain such as the site/campus, transport and logistics and the final product and these actions address issues of pollution, climate change and habitat transformation.

The residential projects undertaken by Mahindra Lifespaces aim to achieve higher efficiency in the utilisation of energy, water and other resources. These projects have been rated gold by the IGBC which is a voluntary and consensus based rating system that evaluates projects based on their holistic use of technologies and materials that are currently available. All of these initiatives have positive impact on environment as well as local biodiversity.



## Mahindra World City Jaipur

The development plans of the Mahindra World City Jaipur (MWCJ) include a focused local biodiversity management programme which is implemented at both the site and product level. This programme primarily focuses on 'Urban Greening' which refers to creating, preserving and restoring green and open spaces in a sustainable manner. The creation of green spaces is achieved with the help of detailed landscaping designs that commit 10 per cent of the total development area to the creation of these spaces. Trees, shrubs, grass patches are all included in green spaces and collectively act like carbon sinks. The exact carbon profile of the selected trees and other greenery is varied and depends on the species, growing conditions and temperature amongst other factors. Selection of species is confirmed after a detailed analysis based on an appropriate estimate for the carbon sequestration potential at the site. Such a selection

process is pertinent because the MCWJ has been developed on barren land and thus it is important that the selected plants require low levels of water for consumption, nurturing and maintenance. This action also contributes towards water conservation at the site and will have an overall positive impact on the biodiversity of the region.

About 10,095 native plants and trees have been planted as a part of the Urban Greening in MWCJ. The benefits of such a landscape include reduction in heat island effects, increased efficiency in energy consumption, social/health improvements, greater land value, better air quality and increased ability to adapt to climate change through permeable land. It also serves to preserve native species and restore their habitat. The complete list of native plants and 10,095 trees planted on site can be found in the MWCJ Environmental Impact Assessment.

# Project Hariyali

Project Hariyali started in 2008-09 with support from the Department of Forest, Government of Maharashtra and in collaboration with a local NGO – A K Rural Development Trust. The company has taken 205 ha of forest land under a 7 year lease for tree plantation, and soil and water conservation.

During the last year, apart from maintenance of trees planted previously, 22,500 new trees were planted as a part of this project to take the total plantation to 165,000, thus maintaining the green cover of the landscape, ensuring soil and water conservation, and maintaining the local biodiversity of the region.



# Way Forward

Mahindra Lifespaces has identified biodiversity as one of the key material issues and have inculcated various biodiversity management programmes in their development projects. The company aims to create a positive impact through its

business and actions and undertakes robust assessment and management framework to ascertain the environmental impact of their projects. It plans to work on biodiversity management for two of its locations by 2020.

# Paharpur Business Centre

*Paharpur Business Centre (PBC) was established in 1990 in the commercial hub of New Delhi, India. PBC is a green MSME in the real estate and service sector that offers ready-to-move-in office solutions with “world class” amenities and conference facilities on plug-n-play basis in mountain fresh air ambience at flexible terms.*

*It offers 24 x7 luxury furnished space for large or small offices; conferences; trainings; interviews; seminars; corporate lunches and dinners; High-tea and cocktail parties. It also offers state-of-the-art amenities; centrally air-conditioned with mountain fresh air; natural/ LED lighting; 24-hours security & CCTV surveillance; ergonomically and aesthetically designed interiors; laptops; Wi-Fi; LAN; technical support; in-house cafeteria and multi-cuisine resto-bar in the commercial hub of South Delhi.*



## Relationship to Biodiversity

“Care for environment” has always been intrinsic to the business strategies of PBC and believes that a company cannot progress without keeping the welfare of the environment/biodiversity in its vision.

PBC adheres to a corporate policy that supports environmental sustainability in their business and has adopted a 3Ps (People, Planet and Profit) approach in its operations and products. The company and its suite of services are certified to ISO 9001 for Quality Management, ISO 14001 for Environment Management, ISO 22000 for Food Safety, ISO 50001 for Energy Management, SA 8000 for Social Accountability, and OHSAS 180001 for Occupational Health and Safety.

Built to mandatory Government design, PBC is the first retrofit building in India that is USGBC LEED Platinum EB certified (2010). It is also a BEE (Bureau of Energy Efficiency) 5 star rated green building, with an Annual Average hourly Energy Performance Index (AAhEPI) of 28 Wh/hr/sqm. This indicates that the building is energy efficient and has a lesser impact on the environment as compared to the conventional buildings. It has adopted various green technologies in order to reduce its carbon footprint, increase its energy and water efficiency, and manage resources properly. It has achieved 70 per cent energy reduction over the past two decades.

# Biodiversity Management

PBC has undertaken various measures towards improving local biodiversity, energy consumption, water and waste management, indoor air quality, and health and well-being of the occupants.

It has developed the “Nehru Place Greens” park which spreads over an area of 3.3 acres (143,748 sq. ft) and where more than 2,000 trees were planted. Since the park is located in the middle of the city where most office buildings are located, it has contributed in improving the general air quality. CO<sub>2</sub> levels have improved and these levels are also annually monitored by the company. The park provides a green cover consisting of fruit bearing trees that attract migratory birds and other hole-nesting species of animals. Within their office space, the company has taken measures to improve the indoor air quality such as installing small plants, using high Albedo – heat reflecting paints, low VOC emitting furniture and carpets, etc. Its USP, “Indoor Air Quality” (IAQ) is a value to the customers.

PBC uses patented bio-technology to purify indoor air with the help of +1,200 toxin-



removing plants. These are three easy-to-maintain, common indoor plants: Areca Palm, Money Plant and Mother-in-law's Tongue. These plants not only help in detoxifying indoor air but also produce oxygen and maintain its flow throughout the day.

The indoor air quality at PBC conforms to ASHRAE (American Society for Heating, Refrigeration and Air-Conditioning Engineers) and WHO Standards. For its incomparable indoor air quality; PBC has been rated as the healthiest building in NCR by CPCB, MoEF, GOI and Chittaranjan National Cancer Institute, Kolkata.

In order to reduce energy consumption and heat release the company has upgraded the HVAC, electrical system and the cooling tower. It has also installed energy efficient 5 Star rated air conditioners and other electrical appliances. The company also uses 36 natural skylights in the green house that harness solar energy and has painted the rooftop of its building white with a light reflecting paint (High Albedo paint) which reduces the heat gain into the building from the rooftop. As a result, they have been able to eliminate 37 T5 lights thus saving 17.76

KW per day. Thus, PBC has been able to reduce its maximum demand from 725 KVA to 350 KVA, resulting in a saving more of more than Rs 8 million/annum or USD 2.7/ft<sup>2</sup>/year.

PBC has extensively adopted the use of native and drought tolerant plants, in order to manage water usage. Such plants consume less water as they are already adapted to the local environment. These plants are grown in hydropones which makes them more efficient in terms of water consumption and air-purification. PBC has also put a number of water-efficient Sky Planters within its premises.

A large quantity of water is flushed out in toilets. Therefore, PBC replaced 27 flush valve based water closets (WC) by cistern based 4 litre/2 litre water closets. This initiative helped them in saving approximately 4,500 litres of water per day. PBC has also installed sensor taps and waterless urinals to manage water efficiently. The flow rate of water in the sensor taps is 5 LPM which further leads to the savings of approximately 63,430 litres per year. Waterless urinals save almost 2, 25, 000 litres of water every year.

PBC harvests rain water which is collected from the roof that has a total catchment area of 2,200 sq.ft. The average amount of water that is recharged to the ground is approximately 58,000 litres/year. This has been possible with the help of inputs taken from Centre for Science & Environment (CSE) and TERI.

The company has also taken measures to increase their waste management efficiency. These measures include recycling and reusing paper, use of e-waste recyclers to discard e-waste, use of internal electronic mail to ensure paperless communication, recycling plastic bottles, segregation of waste at source and use of vermiculture to convert food waste into organic nature manure.

Additionally, the company also promotes green transport through the use of electric carts, car-pooling and CNG run vehicles for official purposes. It encourages green commutation and appreciates all employees who choose green ways to commute.

As a part of its CSR activities, PBC organises “Nanhi Chhaan” every year. “NANHI CHHAAN - Betiyan Aur Jungle, Jeevan Karein Mangal” is a gender equality and ecological conservation program of CII - Northern Region for the corporate sector to promote girl child and environment conservation. PBC actively supports this program by organising tree plantation drives wherein saplings are planted in the name of baby girls born to the PBC members.

In addition to this, PBC organises a fresh water drive for birds and stray animals, especially during the summer season. Many birds and animals die during that season due to lack of water. Therefore, to enhance the convenience of the birds and animals, fresh water is kept in earthen bowls at different locations around the building.

## Way Forward

Looking ahead, PBC has is looking to frame CSR policies and objectives as per the new Company's Act 2013 and make biodiversity an important part of it; carry out more research and developmental activities in the IAQ segment by experimenting with green vertical walls, optimising hydroponic system of growing plants, to get ambient and inside CO<sup>2</sup> at same levels and further reduce VOC's, bacteria and fungus from the indoor air; educate and create awareness amongst

our vendors/suppliers about energy and resource efficient products, and by demanding the same; continuously evaluate the strategies for biodiversity and sustainability and improve them accordingly so that they have positive impacts on our business and environment; implement new strategies to reduce the carbon footprints; and spread the word, especially on social media so that their message reaches the maximum number of people.

# Reliance Infrastructure Limited

*Reliance Infrastructure Limited (RInfra) is a group company of the Anil Dhirubhai Ambani Group. With businesses in energy, infrastructure, and engineering procurement and construction, RIL is ranked amongst India's top 25 listed private companies in terms of all major financial parameters, including assets, sales, net worth, profits and market capitalisation.*

*In energy RInfra is engaged in the generation, transmission and distribution of electricity, the company operates a 500MW (2x250) coal-based thermal power plant at Dahanu, Maharashtra that was commissioned in 1995. Since its inception, the plant has been recognised on various platforms for its safety and green initiatives.*



## Relationship to Biodiversity

In 1996, the Dahanu Taluka was declared an eco-sensitive zone by the Ministry of Environment and Forests. The resulting stringent environmental norms required a redoubling of efforts by the Dahanu Thermal Power Station (DTPS). Given the critical nature of the area in which the plant is located, the plant has earmarked habitat transformation, overexploitation and pollution as the key areas of focus.

In its operations, the plant has a policy which focuses on reducing the negative effects on

the surrounding environment. In the beginning of the production process, steps have been taken for optimal utilisations of the used natural resources such as coal and water and similarly, structures have been setup to minimise the harmful residual effects. DTPS has also undertaken initiatives for mass plantations, mangrove plantation, water conservation and the conservation of flora and fauna.

# Biodiversity Management

As a part of its operations, DPTS commissioned the setting up of a flue gas de-sulphurization unit. flue-gas desulfurization (FGD) is a set of technologies used to remove sulphur dioxide (SO<sub>2</sub>) from exhaust flue gases of fossil-fuel power plants, and from other sulphur oxide emitting processes.

The aim of installing the FGD unit was to reduce and control the SO<sub>2</sub> emission. The method adopted by the DPTS is 'wet scrubbing' in which the natural alkalinity of seawater is used to remove sulphur dioxide during the scrubbing process.

Electrostatic precipitators have been installed in the plant that are filtration devices that remove fine particles, like dust and smoke, from a flowing gas using the force of an induced electrostatic charge minimally impeding the flow of gases through the unit. The Electrostatic precipitators at the plant have four passes with six fields and operate at an efficiency of 99.91 per cent.



Since the plant is dependent on natural resources like water and coal, steps have been taken to utilise them optimally, such as:

- Use of blended coal (Indian and imported coal) to improve efficiency in consumption;
- Daily monitoring and control of use of natural resources like coal and water by deviation analysis;
- Conversion of heavy fuel oil (HFO) to light diesel oil (LDO) to nullify use of steam for heating. The excess steam after switching over to LDO was utilised in vapour absorption machine (VAM) for air conditioning purposes;
- Recycling of water for horticulture initiatives.

Regular overhauling of the unit is carried out to improve efficiency. Provision of a 275 metre stack ensures better dispersion of total particulate matter as well as gaseous emission. The plant is also ISO 14001:2004 and ISO 50001:2011 certified.

Since the installation of the FGD units in October 2007, the SO<sub>2</sub> emission which was more than 50T per day, decreased to less than 6T per day. Similarly, the introduction of the Electronic precipitators that control the fly ash that results from ash burning, have reduced particulate emission to 59 mg/Nm<sup>3</sup>, which is below the stipulated norm of 150 mg/Nm<sup>3</sup>.

Apart from the steps taken for environmental management and protection in its operations, the plant has also undertaken initiatives in the areas of spreading awareness, community conservation services by providing free plant saplings, implementing various water

conservation programs in the vicinity and knowledge diffusion by conducting visits of farmers, villagers to DTPS horticultural initiatives. Over 1.5 million species of forest, fruit and ornamental and 23 million mangroves have been planted by the company since its inception in 1991. Through rainwater harvesting, 40000 m<sup>3</sup> of water has been conserved in the plant cumulatively since 2009 till 2012. Additionally, awareness drives during World Environment Day, energy conservation week, knowledge management sessions and other special training programs are conducted on regular basis for all DTPS personnel as well as outsiders.

## Way Forward

In the future the plant is looking to identify areas to conserve forest species, cultivate medicinal plants, increase the plantation of indigenous species, and map the entire vegetation of the region through GIS. At present, despite the presence of several exotic species, the DTPS campus supports a fair amount of biodiversity, which includes

around 190-200 plant species, insects, birds, reptiles as well as mammals species. DTPS is planning to do continuous monitoring and detailed survey of the area and engage in the plantation of native plants instead of exotic and ornamental varieties for support and improvement of biodiversity.

# Rio Tinto India

*Rio Tinto Group is a British-Australian multinational metals and mining corporation with headquarters in London, United Kingdom, and a management office in Melbourne, Australia. The company was founded in 1873, when a multinational consortium of investors purchased a mine complex on the Rio Tinto river, in Huelva, Spain, from the Spanish government. Since then, the company has grown through a long series of mergers and acquisitions to place itself among the world leaders in the production of many commodities, including aluminium, iron ore, copper, uranium, coal, and diamonds. In India, Rio Tinto is at the initial stage of the Bunder Diamond Project in Madhya Pradesh.*



## Relationship to Biodiversity

As mining can significantly alter natural habitats, Rio Tinto is committed to achieving a net positive impact (NPI) on biodiversity, a strategy launched at the 2004 IUCN World Conservation Congress. Rio Tinto is taking steps to determine how wildlife must be protected and is working with the government, local partners and industry experts; identify biodiversity values

impacted by their activities; prevent, minimise, and mitigate biodiversity risks throughout the business cycle; responsible stewardship of the land they manage; identify and pursue biodiversity conservation opportunities; and involve communities and other constituencies in managing biodiversity issues.

# Bunder Diamond Project

The Bunder Diamond Project was discovered in 2004 by Rio Tinto and in 2010 a State Support Agreement was signed with Government of Madhya Pradesh as an endorsement of the mutual commitment to the development of the project. The Government of Madhya Pradesh gave in principle approval to the issue of a mining lease for the Bunder project in January 2012 and mine plan approval was obtained in July 2013. Rio Tinto is currently working on the environmental and forestry approvals required for executing a mining lease. Once developed the Bunder diamond mine is expected to place Madhya Pradesh in the top ten diamond producing regions of the world. Production is expected to start around 2020.

Bunder is considered to have regional habitat values for important plant and animal species and an initial flora and fauna assessment carried out during OoM (Order of Magnitude study) by the Forest Research Institute (Forest Research Institute, 2007) highlighted the presence of significant flora and fauna, including a number of IUCN listed threatened species. The nearby Panna National Park



was created in 1981 and was declared a Project Tiger Reserve by the Government of India in 1994. While the tiger is claimed to be found in most of the sanctuaries in the region, land use pressure and forest clearing has steadily degraded the remaining tiger habitat. The declining tiger population gradually retreated to the forests surrounding the Panna Reserve and the last remaining tiger disappeared from the Reserve in 2009. Fortunately a successful tiger reintroduction program followed and today Panna Tiger Reserve has 18 resident tigers.

Tigers have not been seen in the Bunder region for over 80 years and there is no evidence to suggest that tigers use the Bunder region any longer. Recently the Government proposed to increase the Panna Tiger Reserve area to provide an improved and more extensive habitat for tigers. The Bunder core area and 10 km buffer zone remain outside this newly proposed area. No confirmed sightings of tigers have been reported in the Bunder area by the study team or the Government.

To better understand the biodiversity of the Bunder area and to satisfy Rio Tinto's biodiversity strategy requirements, a more detailed baseline biodiversity survey of the project site was carried out during 2011. Planning of the study was carried out by Rio Tinto HSE under advice from The Biodiversity Consultancy with Indian specialists/consultants engaged to conduct the additional flora and fauna studies.

Faunal groups targeted by the survey were mammals, birds, reptiles and fish due to the predominance of threatened species within and potential impacts to these groups. Surveys were conducted in both pre and post monsoon seasons to capture the temporal variability in species present at the site and were designed to identify the presence or absence of key global and nationally threatened species as well as identify potential short range endemic or locally significant species. The study area encompassed the mining lease and the ten kilometre study area zone (or buffer zone) prescribed by government but with a strong focus on establishing the presence or absence of rare and endangered species.

Bunder has initiated a partnership with the Bombay Natural History Society (BNHS) to protect India's endangered vulture species and maintaining the biodiversity of the Madhya Pradesh region of India. Classified as "critically endangered" by the International Union for the Conservation of Nature, the Indian vulture population has seen serious decline in recent years, threatening the balance not only of the

ecosystem but the economy and public health. Vultures are a critical part of the food chain. By removing rotten meat and bones they maintain a balanced ecosystem and prevent the unnecessary spread of disease. The dramatic decline in the Indian vulture population is directly linked to animal husbandry practices, namely the use of the pain killer, Diclophenac, to treat cattle. This pain killer poisons the vultures when they eat the carcasses of cattle. Today almost 99 per cent of the vulture species in India has been eradicated. The central Indian state of Madhya Pradesh, home to Rio Tinto's developing Bunder diamond project, has a thriving population of birdlife and is a natural habitat for vultures. Together with Birdlife International and the BNHS, a 100 kilometre vulture "safety zone" will be established in Madhya Pradesh. The expectation is that vultures from captive breeding centres in India will be able to be re-introduced into the wild and over time revert back to being a self-supporting population. In the first partnership of its kind in the mining industry in India, Rio Tinto signed a Memorandum of Agreement with the Bombay Natural History Society to support a number of wildlife management initiatives over a five year period.

## Way Forward

Bunder wishes to ensure that it minimises the impacts of its operations on biodiversity in the local area and aims to have a net positive impact (NPI) on biodiversity through

avoiding and mitigating impacts, appropriate biodiversity offsets and additional conservation actions.

# The Royal Bank of Scotland N.V. India

*The RBS Group is a large international banking and financial services company which has been present in India since 1921 with a clientele consisting of blue-chip Indian corporations, leading multinationals, large financial institutions, high net-worth individuals and the Indian government. RBS Foundation India (RBSFI) is the company's CSR arm that addresses development issues. 'Poverty Alleviation' has been identified as the foundation's primary goal that is engaged in finding solutions to combat poverty and exclusion in the country. The Foundation attempts to promote financial inclusion by addressing the core issues of livelihood opportunities and environmental degradation for the rural population. RBSFI functions by extending support to non-governmental organisations (NGO's) that are involved in implementing programmes at the village level. The focus areas of the RBSFIs support are technical assistance for enhancing income generating capacity, linkages with market and finance through community based organisation.*

# Relationship to Biodiversity

RBSFI believes that in order to achieve desired results in areas of economic inclusion and poverty alleviation, effective measures have to be taken that ensure new, alternative livelihood opportunities and practices for the financially excluded rural population, reducing the dependence and pressure on natural resources - 'the foundation recognises that livelihood challenges cannot be addressed in isolation and the conservation of biodiversity, preservation of natural resources and/or protection of wildlife have to be factored in while designing and creating livelihood opportunities'. The initiatives undertaken by the foundation therefore are introduced to communities that are dependent on natural resources and their critical ecosystems.

RBSFI's 'Supporting Enterprises Programme' focuses on local communities living in protected areas like national parks, reserves, sanctuaries and corridors between protected areas and other ecologically important locations. It attempts to shift the livelihood dependence of poor communities away from natural resources by creating other sustainable livelihood opportunities. This is done through setting-up of SHGs (self-help groups), facilitation of entrepreneurial skills, creation of income generating activities and convergence with government programmes.

## Biodiversity Conservation and Livelihood Creation in Mangalajodi

Mangalajodi is a village on the marshy shores of the Chilika lagoon in Orissa, the second largest brackish water lagoon in the world and a designated Ramsar site. A Ramsar site comprises a wetland deemed to be of "international importance" under the Ramsar Convention. The Ramsar Convention is an international treaty for the conservation and sustainable utilisation of wetlands, recognising the fundamental ecological functions of wetlands and their economic, cultural, scientific, and

recreational value. It is named after the city of Ramsar in Iran, where the Convention was signed in 1971.

The marshes in Mangalajodi are shallow freshwater wetlands connected by channels cutting through the reed beds with the brackish water of Chilika lagoon which provide a nutrient high environment for the rich floral and faunal diversity to thrive in.

However, the flora and fauna in the area were threatened and abused as local

villagers, due to lack of alternate sources of income, were engaged in poaching water birds and eggs on a large and commercial scale. Mangalajodi came to be known as a "Poachers Paradise", evident especially after only 5000 birds were reported in the migratory season of 2001 by the Bombay Natural History Society (BHNS).

Given the ecological relevance of the region and the overlapping lack of alternative livelihood opportunities, RBSFI earmarked the village to implement a project under its 'Supporting Enterprises Programme'.

RBSFI's attention was brought to this area by the efforts undertaken by a local NGO called Wild Orissa who played a significant role in conserving the biodiversity surrounding the village of Mangalajodi and motivating the community to convert from poachers to protectors. Further exploration of the problem and site revealed the importance of saving the ecologically sensitive wetland region and the need to provide the local community with a sustainable source of livelihood.

RBSFI partnered with NGO Indian Grameen Services, and adopted a two-pronged approach in Mangalajodi. On one hand, steps were taken to conserve and promote the globally recognised rich biodiversity, home to an abundance of migratory bird species. On the other hand, eco-tourism and other community-based projects were put in place to support and expand the livelihood opportunities of the local community.

The establishment of a community owned and operated eco-tourism enterprise, the

Mangalajodi Ecotourism Trust (MET), developed as an alternative livelihood option has created alternate sources of incomes its members. They are employed as boatmen, guides, souvenir shop operators and hospitality service providers.

The enterprise-based conservation approach is a combination of efforts in three focus areas. First, the foundation initiated an eco-tourism project following the conservation efforts made by the organisation called 'Wild Orissa'. The project aimed to enhance the 'livelihood opportunities' of the local communities by involving them as stakeholders in the protection of their environment. Second, 'technical assistance' was provided to the locals by training them in hospitality, catering, guiding tourists, marketing, bookkeeping and in management of the MET. Finally, through 'employee engagement', RBSFI was able to raise funds to set up a solar charging station and a souvenir shop.

These initiatives have had a positive impact in terms of promoting the village's biodiversity, tourism and reducing the dependence on use of natural resources.



The conservation efforts, combined with the eco-tourism project have had positive impacts. Protection and conservation has improved Mangalajodi's faunal biodiversity which includes birds, fishes, snakes, monitor lizards and the fishing cat. 1,50,000 migratory birds have been recorded by the BHNS in Mangalajodi, leading it to be designated by Birdlife International as an 'Important Bird Area' for its importance as a significant waterfowl habitat. Ecologically sustainable employment opportunities have been created to for the locals with the setting up of a solar charging station with a capacity of 40 solar lantern units which is being managed profitably. A souvenir shop has also been established that promotes the eco-tourism initiatives and also generates revenue for the trust.



Additionally, the rise in the Nitrogen and Phosphorus levels due to the higher levels of guano deposited in the water body due to increased avian population is a major factor for the high biomass production of macrophytes and has resulted in lucrative fisheries in the region.

Such an approach to protect and conserve biodiversity, while ensuring the creation of livelihood opportunities, instills a sense of ownership in people which makes for an effective intervention.

## The Kanha-Pench Corridor Project

The Kanha-Pench landscape, which is an 'S' shaped forest cover stretching over 160 kms, an area of 3162.23 sq kms and spread over three districts is apart of the central highlands of India and is one of the most important forest corridors in the country. Through its hydrology and biodiversity, the Kanha-Pench landscape supports the critical ecosystem of the area, through pollination of seeds, propagation of flagship species of carnivores and storage of carbon stocks that have an impact on climate change. It also supports the local rural community which is dependent on the landscape to varying extents, ranging from collection of food, fuel, fodder and intensive use of the

water bodies (part of the area is a watershed for river Narmada).

Problems have arisen due to the fragmentation of the corridor resulting out of increase in anthropological activities. Critical dependency on forest resources has resulted in the overuse and degradation of the forest area. Lack of alternate options, illiteracy and ignorance has resulted in complete disregard by the locals towards conservation and protection of flora and fauna.

The need to conserve and protect the biodiversity of the region, combined with the growing demand for sustainable livelihood opportunities for the local community, RBSFI

has taken measures in the Kanha - Pench region.

Under their 'Supporting Enterprises Programme', the foundation supports a livelihood project in 175 villages covering 12,500 households that are located in the Kanha-Pench landscape. At the implementation level, the project is supported by 'Professional Assistance for Development Action' (PRADAN) and 'Foundation for Ecological Security' (FES).

PRADAN is active in 135 villages and FES in the remaining 40 villages. Both the organisations work at the grass-root level and in collaboration with village institutions such as the Gram Panchayat and other eco-development communities. Together they draw village level plans based on land and

water resources and work at the household level to enhance productivity from agriculture through a combination of watershed/irrigation and on-farm practices. Backyard poultry, kitchen gardening and animal husbandry activities are some of the alternative livelihood options that have been introduced.

Going forward, RBSFI will work towards expanding livelihood opportunities in an ecologically sustainable manner by adopting inclusive strategies of self-governance with regards to women and the marginalised sections of the society. The goal is to boost the health of the Kanha-Pench Corridor by adopting a well-planned approach towards equitable growth and environment sustainability.

## Way Forward

RBSFI has been engaged in projects that have multiple stakeholders and address issues of poverty and environment. In the future, RBS Foundation India plans to

continue involving itself in projects that implement livelihood programmes in the ecologically sensitive rural landscapes of the country.

# Sesa Sterlite Limited

*The Sanquelim Group of Mines belonged to M/s Sesa Sterlite Limited earlier known as Sesa Goa Limited is located in North Goa. Mining of iron ore began in 1965-57 and operated for four decades before it was discontinued in the late nineties as it became uneconomical to mine the low grade ore.*

## Relationship to Biodiversity

Mining has both direct and indirect impacts on biodiversity due to activities like land clearance, discharges in water bodies, and emissions in the air. In Sanquelim, once mining operations stopped, while there was no legislation in place with respect to mine closure, the company initiated its own plan

for the closure and subsequent reclamation of the land. The mines have been reclaimed in a phased manner since the 1980s. The mining region of Goa has a typical tropical climate and receives an annual rainfall of around 3500mm which accentuates the need to reclaim the exhausted mining pits.



# Sanquelim Iron Ore Mine Reclamation

The company carried out several activities in the process of reclaiming the mining area. Technical and scientific support from research institutes [Goa University, National Institute of Oceanography (NIO), Goa and, the Fisheries Department, Government of Goa] was availed wherever required.

## ► Afforestation

Afforestation activities started at the Sanquelim mines in the 1980s. The total area of the mine is 203 Ha., out of which around 105 Ha. have been effectively reclaimed by afforestation. Mine pits were systematically back filled by forming benches making it feasible for carrying out plantation. More than 750,000 saplings have been planted by the company. Species like *Acacia Auriculiformis* and *Casurina Equisatifolia*, advocated and supplied by the State Forest Department, were planted as they are fast growing, leguminous, and can grow on dumps without much aftercare and irrigation. These species were planted as nurse crop so as to prevent erosion on and stabilise the dumps.

Once the dumps were stabilised, one of the reclaimed mine pits was selected to

experiment with different afforestation techniques using native horticulture and forest species. Technical expertise and guidance from various organisations like Goa University, State Agriculture Department, State Forest Department, and the Rubber Board was taken at the time of implementation. Various systems of plantations like horti-silviculture were adopted. Most of the horticulture crops such as mango, banana, sapota, guava, lemon, pineapple, cashew, and spices like black pepper, cinnamom, etc, were successfully planted. The project with the Rubber Board proved that commercial crops like rubber can also be successfully grown on mine reject soils. The *Pluleria* creeper was planted to grow over the *Acacia* and *Eucalyptus* and kill them naturally so as to make land available for planting native species.



## ► Pisciculture Project

Parts of the mine pits were converted to water bodies through rainwater harvesting. The National Institute of Oceanography was approached to determine the feasibility of growing and cultivating fresh water fish in the rain filled pit. Beginning in 1990, fish cultivation was successfully carried out of species such as Rohu, Katla, Common Carp etc. The project has also resulted in increasing bird and butterfly activity in the area.



## ► Biodiversity Management Plan

Following the success of the reclamation activities, in consultation with the Forest Department, a Sanquelim Mine Management Plan was prepared so as to implement similar activities in the rest of the mining area. Mature acacia plantations were cut in order to plant native species. Two medicinal gardens - Nakshatra Vatika and Charak Vatika - based on constellations, zodiac signs and

Ayurveda, were developed with the objective to spread awareness about the various medicinal plants found in the region and their benefits amongst the local community and students.

Another initiative that was undertaken was the butterfly park. Butterflies require two kinds of plants for survival in its life - a host



plant and a nectar plant. The presence of them together naturally attracts butterflies and therefore both types of plants were identified and planted at the mine site.

The company also engaged in bamboo cultivation. Bamboo is commercially valuable and known for its environment rejuvenation ability due to its high oxygen emitting capacities and as well as its capacity to capture more carbon and convert it into biomass. Not only is it the

fastest growing of all woody plants, but on cutting it starts growing again. It reaches its fullest height in 60 days as compare to others which can take up to 60 years. The company collected several species of bamboo from across the country with assistance from the State Forest Department and the Forest Research Institute in Dehradun, and grew more than 25 varieties of it.



The various initiatives have significantly increased the vegetative cover and biodiversity profile of the area. Initial studies to assess the biodiversity on the mines were carried out by the Botany Department of Goa University in the year 1994. A recent study by Canopy (an organisation formed

by a group of environment experts in Goa) observed that there are 3 species of mammals, 70 species of birds, 42 species of butterflies, 14 species of Odonates, 12 species of reptiles and 10 species of amphibians in the reclaimed mine area.



## Way Forward

The regeneration of mines carried out in the Sanquelim Iron Ore Mine will be replicated under the biodiversity management plan in

other parts of the mine where mono culture plantation exist.

# TATA CONSULTANCY SERVICES

*TATA Consultancy Services (TCS) was established in 1968 and is a part of the TATA group which was founded by Jamsetji Tata in 1868. The company offers consulting-led, integrated portfolio of IT, BPS, infrastructure, engineering and assurance services. TCS has a diversified portfolio as it provides a range services to varied industries and sectors such as banking and finance, healthcare, retail and consumer products, manufacturing, telecom, resources and energy (oil, gas and renewables). TCS has a global presence with offices across 46 countries and a workforce of 305,000 consultants.*



## Relationship to Biodiversity

TCS recognises that given its large size it will have an impact on the society and the environment through its use of energy, water, paper, and through the generation of waste. Thus, its corporate strategy commits the company to be a responsible corporate citizen by reducing the impact of its operations on the environment. TCS's corporate sustainability approach is founded on three pillars that are sustainable operations, corporate social responsibility, and solutions to customers. The first pillar refers to running the company's operations in a social and environment friendly manner, the second involves 'Impact through Empowerment' in the areas of education, health and environment for the society and

the third is dedicated to providing sustainability services to its customers by integrating sustainability into their business strategies and by unlocking environmental inefficiencies in their value chains.

TCS has made biodiversity management a fundamental aspect of its environment philosophy as the biodiversity considerations are integrated into the company's environment management system. The company carries out biodiversity mapping operations for the TCS owned landholdings throughout India and site-specific biodiversity action plans (BAP) are created and implemented for conservation of flora and fauna found in the depleting urban biodiversity.

# TCS Yantra Park

The TCS office site in Thane, Maharashtra is called 'Yantra Park' and is an IT park that spreads over 13.5 acres of land that consists of 36 per cent open area and 10 state of the art buildings. At this site, the company has implemented various biodiversity conservation and enhancement measures that aim to create a biologically diversified landscape.

Various measures undertaken for conservation of biodiversity is the implementation of biodiversity action plan, i.e. a strategic approach for implementation of various programs for conservation of flora and fauna.

Through its flora conservation programmes, TCS has protected 485 native trees;

successfully transplanted 20 trees; protected rare and threatened species like the Adansonia Digitata Baobab tree; implemented plantation drives as part of Greening the Office Program; established a medicinal garden with 40 species planted; provided a nursery/green house for the propagation of sapling's; and well grown trees are donated to NGOs for the implementation of afforestation programmes. The floral diversity at the park is diverse and is represented by the 181 plant species that belong to 132 different genera and 96 families with 750 well grown trees. The faunal diversity is captured by the 108 different species found at the site. Also, a remarkable increasing trend has been recorded between 2007-08 and 2013-14.



The fauna conservation programs include the creation of Butterfly Zones which is home to 58 species; the Bird Habitat Improvement Programme which, through the provision of nest boxes, feeders and water baths along with the various native trees across the landscape, makes the campus home for 36 species of birds; Snake Conservation Program in which snakes are rescued and released into their natural habitat; Care for Nature Program, that is the protection of injured birds; and vaccination (anti-rabies) and sterilisation program for street dogs (within the premises).

The company has utilised biotechnology to create an onsite waste management system

which further produces organic fertilizers that are used for landscaping through-out the park. Additionally, it has also initiated biodiversity awareness programs to increase awareness amongst its employees.

By adopting such an integrated approach for maintaining biological diversity in urban landscapes the company not only works towards ecological sustainability but also provides business sustenance through ensuring ecological services, enhancing the working environment, by increasing productivity and gaining appreciation from clients, visitors and internal and external stakeholders and shareholders too.

## Marine Turtle Conservation Programme

TCS implements the 'Marine Turtle Conservation' program as a biodiversity conservation measure under the domain of 'Environment' as specified in the company's 'Corporate Sustainability' policy. This programme falls under the broad umbrella of National Action Plan of Climate Change (NAPCC) and the Millennium Development Goals (MDGs) of the United Nations. The urgent need to protect the marine turtle was identified as a goal due to the statistic released by the Marine Turtle Specialist Group (MTSG) of the IUCN that pointed out a 60 per cent reduction in the marine turtle population since the 1960s. The major

reason behind this historical and worldwide decline of marine turtles is nest predation .i.e. collection of eggs by humans and killing of adults on nesting beaches. TCS has adopted to preserve these nesting beaches so that the marine ecosystem remains healthy and balanced.



TCS has launched this programme in association with the Sahyadri Nisruga Mitra which is a Chiplun based NGO that implemented the programme since 2010-2011. The programme proposes to protect the breeding sites from illegal hunting of turtles as well as from natural predators such as dogs and foxes.

The Marine Turtle Conservation Program involves adoption of coastal villages, sponsoring of expenditure for a hatchery for the protection of eggs, provision of protection watchers for patrolling of beaches to prevent hunting/killing of turtles during their breeding season, provision of manpower for translocations of eggs into the hatchery, hatchery management, releasing hatchlings into the sea and

arranging Turtle Festivals, implementation of a Village-Based Tourism Programme, cleaning breeding beaches from pollution, and creating awareness amongst local villagers, tourists as well as TCS employees, etc.

The Marine Turtle Conservation Program has reported the following achievements in the time period from 2010-11 to 2013-14:

- 113 nests as well as breeding population of endangered (female) olive riddle turtles were protected;
- 12119 eggs were successfully translocated to a hatchery;
- 6075 hatchlings were successfully released into their natural habitat during breeding period from 2011 to 2013.

## The Banyan Park

The TCS Banyan Park is located over an area of 22 ha of land in Andheri in Mumbai and primarily focuses on preserving the Indian 'Flying Fox' bats which are the largest fruit eating bats in the world. These species provide significantly to the ecosystem via pollination of flowers, dispersal of seeds and also act like agricultural pest control. Additionally, the 'Bolus' and the 'Guano' which are the spit-out pulp and excrement of the bats respectively also make good natural manure with low levels of phosphorus. A total of 443 plant products have been identified that are derived from 163 plant species that rely on bats for pollination. The impetus behind

conservation of the Indian 'Flying Fox' arises due to the alarming rate at which their population is declining in urban areas due to various threats of urbanisation.

The park has been designed around the need of the 'Flying Fox' species i.e. the selection of species of trees and plants is



dependent on the bats preferences for feeding and roosting. The roosting trees include tamarind, mango, false ashok, cannon ball tree and teak and the trees the bats prefer feeding on include sapota, jackfruits, mango, cashew nut, tamarind, guavas, bananas and papaya. Overall, the park has a total of 1020 well grown trees of which there are 70 tree species belonging to 60 genera and 36 families

TCS initiatives for the protection of the bat colony such as protection of traditional native plant species (which acts as permanent roosting sites and source of food for bats), plantation of fruit bearing trees

within the campus, no construction activities near bat colony and minimum or no interferences of human activities has resulted in conserving depleting population of Indian Flying Fox bats and has also created the largest bat colony in Mumbai.



## Way Forward

In 2014-15 TCS looks to implement the following programmes:

- Formulation and effective implementation of site specific biodiversity action plans at various TCS locations throughout India;
- Community Based Carbon Offset Credit (plantation of 10,000 Teakwood trees) Programme at Chennai;
- Vulture Conservation Program (Gyps Bengalensis White backed Vulture & Gyps indicus Long billed Vulture) at Sriwardhan, Maharashtra;
- Continuation of Marine Turtle Conservation Program in coastal villages of Maharashtra;
- Expansion of Marine Turtle Conservation Program to Nagapattinam in Tamil Nadu.

# Tata Housing

*TATA Housing was established in 1987 and is a closely held public limited company. It is a subsidiary of TATA Sons Limited and the group holds 99.78 per cent of equity share capital of TATA Housing. Primarily, the company focuses on developing properties in residential, commercial and retail sectors but their range of operations includes land identification and acquisition, project planning, designing, sales, project execution, property services and estate management. TATA Housing spans through all consumer segments, offering both value homes as well as luxury housing. The company also holds a diversified portfolio of more than 70 million square feet and has a steady pipeline of projects of over 19 millions square feet.*



## Relationship to Biodiversity

The company's commitment towards biodiversity is identified in its corporate policy towards sustainability. In the sustainability charter of the company, biodiversity is recognised as a focused area of intervention and it is stated that TATA Housing is 'Committed to conserving the biodiversity, the endangered species of flora and fauna and natural landscapes, in

partnership NGOs, civil society and government'.

Under the umbrella of its CSR initiatives, the company has launched various focused programmes and projects. The programme called 'BIG' deals with environment sustainability and biodiversity initiatives.

# Green Operations and Green Green Products

The company has integrated its sustainability strategy and business strategy. The company has mapped its value chain, identified the social and environmental dimensions of its competitive context and leveraged its core-competencies in addressing those elements strategically from a long-term perspective.

Its strategy has been to build green homes using alternative technologies and alternative materials which are sustainable. It has adopted greener construction technologies like pre-cast, reinforced hollow concrete blocks (RCB) and mivan. It has mapped its carbon footprint across the company and has developed a roadmap for carbon footprint reduction as well as carbon abatement for the next 5 years. It has mapped its water footprint using Water Footprint Network methodology and has been taking steps to reduce water consumption and conserve water.

All the Tata Housing projects are green buildings, either pre-certified or certified with USGBC/IGBC/LEED certification. It has over 55.4 million square feet of registered green building footprint, of which 8.8 million square feet have already been certified.

An important measure undertaken by Tata Housing is using advanced technology to



maintain ecological and fiscal efficiency in resource utilisation such that there is minimum impact of emissions and pollutants. It also develops techniques for better management of its core raw materials like water, cement, steel and energy.

For the purposes of efficient water utilisation, the company invests in water management techniques such as rainwater harvesting and recharging, which have been implemented in all projects. Water efficiency measures like use of gypsum plaster, use of curing compounds and use of treated waste water have been implemented which has resulted in conservation of fresh water. The landscape designs include species of plants, shrubs and trees, which are drought-tolerant and this is supplemented with efficient irrigation management and use of grey water and STP (sewage treatment plant) treated water for irrigation and construction purposes.

The energy efficiency efforts undertaken by the company focuses on renewable energy,

use of BEE certified appliances and efficient lighting and equipment. The company also focuses efforts in reducing carbon emissions by use of CFL/LED and by promoting car-pooling, use of public transportation, video/audio conferencing, streetlights and water heaters powered by solar energy, tree planting and efficient daily use of electricity.

To manage utilisation of cement and steel, which are the key raw materials that are used in bulk during construction, the company has adopted techniques such as use of fly ash, gypsum plaster and use of

AAC blocks. The company also ensures that more than 70 per cent of the materials (by cost) used are local materials transported within 500 km radius and that the recycled content of the materials is at least 20 per cent of the total materials by cost.

Through various carbon abatement initiatives 9215 tonnes of carbon dioxide has been abated during the year 2013-14, which is equivalent to 85 per cent of the CO<sup>2</sup> emission of the preceding year. The carbon abatement figures of 2013-14 has been externally validated by M/S Ernst & Young.

## Biodiversity Conservation/BIG

The company implements its biodiversity conservation projects in partnership with WWF-India.

**Biodiversity Conservation:** Activities are carried out in mountain landscapes in Khangchendzonga Landscape in Sikkim and Western Arunachal Landscape in Arunachal Pradesh. The programmes here include:

**a) Greening Young Minds through Environment Education:** This initiative, started in January 2013, works towards spreading environmental awareness amongst school children, school teachers and communities through posters, booklets, notebooks and workshops etc., highlighting the environmental sensitivities of the region. Similarly 'Nature Camps' are



organised for teachers in Sikkim to cover the issues related to biodiversity in Sikkim. During the first year, 3 teachers training camp were organised for 45 schools and 74 teachers. Awareness programs for over 500 students from 20 schools were also conducted.

**b) Red Panda Conservation:** A healthy Red Panda population is evidence of a healthy temperate forest. In India the Red panda is found in Sikkim, Arunachal



Photo Credits: Anil-Cherukupalli

Pradesh, Meghalaya and West Bengal. The major threat to their survival is poaching for their skin and also capturing of cubs for pets. Red panda shares its habitat with globally threatened species like musk deer, gaur, clouded leopard, common leopard and satyr among others. With WWF-India, Tata Housing is implementing management plans to secure the red panda habitat, and therefore indirectly other species as well.

As part of the Red Panda Conservation project, a study was conducted during 2012-13 in the conservation sites at Mandla and Jung area in the Kameng and Tawang districts of Western Arunachal Pradesh. The study included a field survey assessing the presence of Red Pandas in the selected areas, analysis of data obtained through GIS (Geographic Information System) and development of distribution maps and supporting conservation and management of the Red Panda population and its habitats. WWF-India, the partner organisation that conducted the survey witnessed direct sightings as well as indirect evidence of its presence. More evidence of the Red Panda's presence has been found in 2014 in Pangchen Lumpo Muchat Community Conserved Area (PLUMCCA) of Pangchen Valley.

**c) Developing Strategies and Generate Awareness to Sustain Ecosystem Services of High Altitude Wetlands:**

This programme has been undertaken in the Tawang district of Western Arunachal Pradesh and Gurudongmar Lake regions of North Sikkim district in Sikkim and includes strengthening the conservation and management of Bhagajang wetland complex in Western Arunachal Pradesh Landscape (WAL), strengthening springshed conservation, supporting initiatives for fuel wood reduction in WAL, initiating dialogue with the government for a suitable policy to support the community engaged in wetland conservation in WAL, documenting and creating awareness on the ecosystem services of Gurudongmar Lake amongst the stakeholders in Khangchendzonga Landscape(KCL), management of garbage at Gurudongmar and villages downstream in KCL, and strengthening initiatives for Tsomgo Lake management with Pokhri Sanrakshan Samit, a local committee which takes care of the Tsomgo lake in KCL.

**d) Strengthening Springshed Conservation:**

In collaboration with the Rural Management and Development Department (RMDD), 22 springs have been identified in east, west and south districts of Sikkim, respectively for regular monitoring. Discharge measurement of each of these springs is being monitored every month by the respective field facilitators of that area since November 2013. Training on springshed management, explaining the different types of springs and their geohydrology, was conducted for some members of the village community.

**Tiger Conservation:** Measures have been taken in six tiger landscapes of India such as 1) The Terai Arc landscape, 2) The Sundarbans Landscape, 3) The Satpuda-Maikal Landscape, 4) The North Bank Landscape, 5) The Kaziranga Karbi Anglong Landscape and 6) The Western Ghats Landscape are being undertaken. The company supplements the protection capabilities of government forest field staff, by training and by giving protective gears and thereby help to curb poaching of tigers. Patrolling equipment such as GPS units, Compass, binoculars, digital camera, LED torches, winter jackets, trekking shoes, rucksacks, mosquito nets, rain coats, patrolling vehicle etc. are provided to frontline staff in tiger reserves, national parks, sanctuaries etc.

**Snow Leopard Conservation in Ladakh:**

The Snow Leopard is one of the important species for maintaining a balance in the ecosystem in snow-clad mountains, yet it is one of the least studied and most endangered species. Of the 7000 Snow Leopards in the world, India accounts for 400-700 and are found across 1,30,000 sq km in Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh. Tata Housing in partnership with WWF-India had launched a crowd funding campaign in 2013-14, which generated great awareness about this elusive cat. It is now working to estimate the number of Snow Leopards in the region by camera trapping, monitoring and research.

## Way Forward

The company believes in the equilibrium of People, Planet and Profit and plans to continue working towards biodiversity

conservation by protecting and preserving endangered and threatened species across India.

# Tata Steel

*A subsidiary of the Tata Group, Tata Steel Limited has over 100 years of experience in mining and steel manufacturing. The company is among the top ten global steel producers with total annual crude steel capacity exceeding 28 MTPA.*

*In its birth city Jamshedpur, Jharkhand Tata Steel operates a 9.7 MTPA crude steel production facility and a variety of finishing mills. Its iron ore mines are located at Noamundi, Jharkhand and Joda, Odisha; sites of captive coal mines are at Jharia and West Bokaro in Jharkhand. Furthermore, new greenfield steel project is underway in the state of Odisha to expand the production capacity to 16 MTPA. In the future, greenfield steel projects are planned at Chattisgarh and Karnataka. Global manufacturing operations of Tata Steel are spread across the Europe (UK, Netherlands, Germany, France and Belgium) and South East Asia (Thailand, Singapore, China and Australia).*

# Relationship to Biodiversity

Operating an integrated steel plant in India, Tata Steel faces a number of biodiversity risks emanating from mining to finished steel products. Demand for iron ore and coal is a driver for land-use change, whereas intensive use of water threatens availability of water for living organisms as the global water crisis is deepening. Air and water pollution is yet another risk that can have negative impacts on biodiversity. On that score, like other mining companies across the globe, Tata Steel converts the mines and quarries into habitats for local wildlife through extensive reclamation, afforestation and reforestation programmes.

Tata Steel is conscious of its biodiversity footprint and has been taking proactive measures. By means of its Environmental Policy, Tata Steel is determined to develop and rehabilitate abandoned sites through

afforestation and landscaping as well as protect and preserve biodiversity in the areas of its operations. Furthermore, the company commits to conserve natural resources and ecology as per its Sustainability Policy.

The city of Jamshedpur is one of the greenest cities in the country with around 30 per cent green cover canopy. Tata Steel has planted around 4 million trees of native varieties in Jamshedpur, mine locations and wastelands in the last two decades towards preservation of biodiversity.



## Centenary Growth Park and Rose Garden

Tata Steel aims at drastically reducing the level of environmental degradation. In this light, a large area once used to dump construction material was transformed into a verdant green park dubbed as the Centenary Growth Park. This was as part of the company's overall plan to continuously improve the environment within the Jamshedpur steel works.

As an effort to provide a niche for those within the local ecosystem which require special attention, while demonstrating that heavy industry does not necessarily debilitate the environment, the Centenary Rose Garden was created within the steel works. The Rose Garden has several varieties of roses, including Dutch Roses, such as 'Naranga' (orange), 'GoldStrike'

(yellow), 'First Red' (red), 'Noblesse' (pink), as well as high quality roses which are being kept under protected conditions. The

garden has over 3,000 roses and the area under production in polyhouse amounts to 560 square metres.

## Botanical Park & Butterfly Park

The Sir Dorabji Tata Botanical Park, Noamundi which covers an area of 45 acres has been built on reclaimed iron ore mine. The park houses a Cactus park which has 240 varieties of Cactii and Succulents. An Amazonian corner has been created in the park with trees of the Brazilian rain-forest variety like Uolicury, Mourubas, Gwarapur, Fishtail and Areca. These species survive for nearly 400 years and their leaves don't fall thereby providing very good green-cover. The park also has 70 species of medicinal plants used in traditional medicines. These plants produce steroids, flabonoids, glycosides, oils and fats, and include insecticidal and insect repellent plants.

The Botanical Park houses a Butterfly Park which has been established across an area of 550 square feet in. The park houses about 350 varieties of native butterflies and variety of plant species such as Blood tree, Hibiscus and Karia, which are specially arranged in pots to create 'at home' atmosphere for butterflies. The facility is equipped with temperature control devices, exhaust fans, waterfall for moisture retention within the enclosure and sugar-honey paste tucked in hanging pots with plants installed. A separate area of 200 square feet is kept for breeding, propagation and rearing of butterflies from pupa stage. The thriving butterflies are an indication of the clean environment in the mining area.

## Jubilee Park and Zoological Park

Spread across an area of 147 acres, the Jubilee Park is one of the most beautiful areas of the industrial city Jamshedpur. The park is home to 120 types of trees and plants. With a size of 30 acres, the Jayanti Sarovar Lake in the park supports fishes like Rahu, Katla, Cat Fish, Garai, Cheng and Pontius. It is habitat to various species of mollusc like pond snail, unio, pila and melanoids as well as attracts variety of migratory birds during winter.

The Jamshedpur Zoo managed by Tata



Steel is located within this park. This zoo built on 37 ha of land has 36 species of birds and 28 species of animals, reptiles, butterflies and fruit bats. There are 21 birds, 5 reptiles and 63 mammals of the endangered variety in the zoo.

# Dhamra Port and Olive Ridley Turtles

Tata Steel had taken up a project through its subsidiary the Dhamra Port Company Ltd for building a deep sea port at Dhamra in Odisha, aimed at import of raw materials and export of products from its new Greenfield steel plant at Odisha. However, the port site was 15 km North of Gahirmatha, a mass nesting site for Olive Ridley Turtles. To address concerns of environmentalists, Tata Steel in partnership with IUCN in 2007 have developed turtle friendly lighting systems, turtle deflectors



from dredging operations as well as had intense engagement with local fishermen communities to ensure turtles are conserved to the satisfaction of environmental specialists.

## Way Forward

Presently, a robust review of current approach to biodiversity management at Tata Steel has been initiated in partnership with International Union for Conservation of Nature (IUCN). The project aims at baselining the biodiversity at Tata Steel's areas of operations, through ground truthing studies, secondary research, including stakeholder interactions and understanding the ecosystem services provided by the biodiversity. The risks to biodiversity and

ecosystem services from the company's operations and community behaviour will be identified and a biodiversity conservation and management plan will be developed, which will also include capability building of local stakeholders including developing mechanisms for collaboration. One of the outcomes of this project would be a stand-alone Biodiversity Policy at Tata Steel.

# CONCLUSION



The case studies in this report highlight the variety of initiatives taken by the companies in India to address the various threats that plague biodiversity and ecosystem services. There is no debating the fact that biodiversity and ecosystem services are essential for the survival of people, communities, and businesses. Companies have to take measures to ensure that the ecosystem is managed sustainably, enhanced where possible, and protected where necessary. Without this, companies are only putting their business and its future at risk – and this is the business case for it.

The primary focus of companies in the last decade or so, in part due to norms and regulations enforced, has been to address the threats of pollution and climate change. Over time the focus is also shifting to issues related to habitat transformation, overexploitation and invasive species.

IBBI provide a platform that bring various stakeholders together to share good practices and provide the necessary advice and guidance for companies to assess the present and future risks that the ecosystem and consequently their business face and how to address and mitigate them. While some are incorporating biodiversity management within some of their operations some are intervening through their CSR initiatives. What is required is that it ultimately becomes a part of the business model itself of companies – be it companies that directly or indirectly impact or are impacted by the loss of biodiversity and ecosystem services.

The 10-point IBBI Declaration lays out certain points for its signatories ranging from creating awareness about biodiversity initiatives, setting objectives and targets for its management, assessing the risks and opportunities, engaging in dialogue with relevant stakeholders, to the valuation of biodiversity and ecosystem services. This is not as monumental a task as it appears. Interventions made by the 20 companies highlighted in this report are evidence that companies have already started taking action on these points, many having initiated activities several decades ago - which goes to show that this is not something entirely new. The Indian industry has acknowledged the fact that biodiversity concerns need to be addressed holistically as opposed to aspects of it in isolation.



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- Energy and mitigation of greenhouse gas emissions
- Environment
- Sustainable economic development
- Skill development





