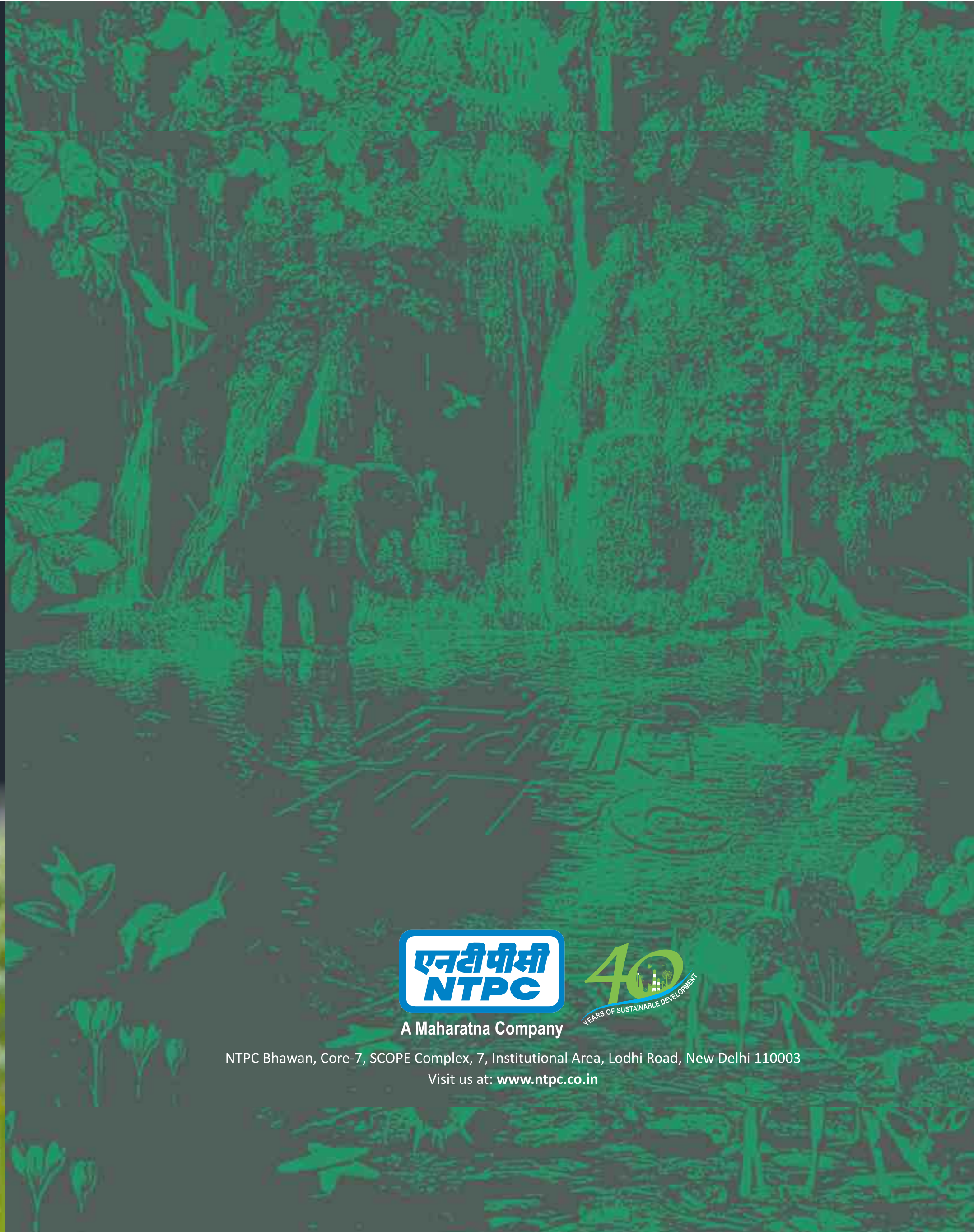


Land of Mega Biodiversity

India is one of the 17 mega biodiversity countries of the world. While covering just 2.4% of the Earth's total land area, India provides shelter to 7- 8% of the recorded species of the world. Biodiversity exists primarily at three levels, including species levels, genetic level and ecosystem level. India also happens to be biogeographically located at the junction of the Afro-tropical, the Indo-Malayan and the Palearctic realms. As a result of its proximity to all the three realms, India is home to a unique assemblage of biodiverse elements that's typical to each one of them.



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The Good Earth



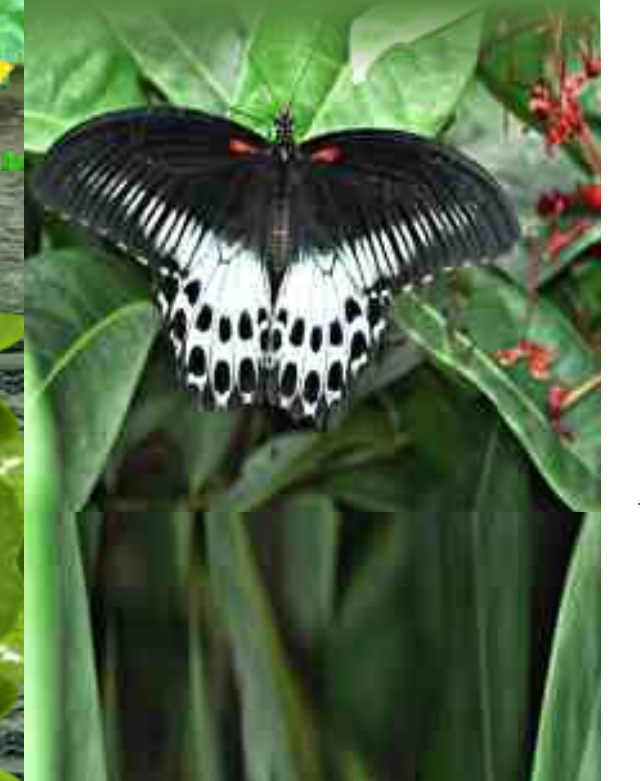
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The Good Earth
Where Nature flourishes in all her variety

Wealth of Biodiversity

Biodiversity comprises all the different species that live on our planet as well as the genetic differences within each species. It also refers to the multitude of different ecosystems in which species form unique communities, interacting with one another and the air, water and soil.





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critique

The Good Earth



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The Good Earth

Where Nature flourishes in all her variety

"Every time we lose a species we break a life chain which has evolved over 3.5 billion years,"

- Jeffrey McNeely, IUCN Chief Scientist.

India contains 172 species of animal considered globally threatened by IUCN, or 2.9% of the world's total number of threatened species (Groombridge, 1993). These include 53 species of mammal, 69 birds, 23 reptiles and 3 amphibians.



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Guardians of India's Biodiversity

While recognising the urgency, NTPC as an environmentally responsible corporate has consciously taken up the plantations for conservation of Biodiversity. In pursuance, Medicinal Plant Gardens conserving more than 70 Medicinal Species have been developed at Simhadri, Ramagundam, Unchahar TPS. Neem Vatika at Jhanor, Awla Udyan at Rihand, Fruit Tree Garden at Vindhyachal and Simhadri, Nakshatra Vatika and Rashi Vatika at Unchahar and Dadri are live examples of our conservation endeavors. In all the projects, Green Belts, Roadside Plantations and Eco Parks have been developed helping in reviving the vanishing flora, fauna and living micro organisms. Recently a Bengal Florican and a few leopards were sighted in Dadri Eco Park " Panchvati". NTPC has taken up conservation projects as part of EMP for Cheer Pheasant in Koldam, Great Indian Bustard in Solapur, Black Buck in Meja, Elephant habitat in North Karanpura. Studies are on for conservation of the national aquatic animal i.e. Gangetic Dolphins at Kahalgaon. Further, proposal for conservation of Olive Ridley Turtles are under active consideration. Reportedly, NTPC has developed Carbon sinks by planting 23 million trees so far. In tune with INDC-2030, it aims to create Carbon sinks by planting 10 million more trees in the next 10 years. NTPC has realized that there is an urgent need to act collectively at a much faster pace rather than allowing further depletion of Biodiversity.



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Foreword

Being a responsible corporate citizen, NTPC endeavors to attain sustainable development by striking a balance between economic growth and environmental conservation. While powering the nation with 47178 MW energy, the landscape of projects have been adorned with green belts, road side plantations, eco-parks, fruit orchards, flower gardens and medicinal plant gardens. In the process, it has immensely helped in revival of habitats for the depleting biodiversity. Eco-rehabilitation of Dadri ash mound is a unique experiment in the country wherein greenery has been created akin to natural forests. The greenery over the ash mound has successfully resulted into revival of flora and fauna in the area. NTPC is consciously working as keeper of traditional knowledge pertaining to biodiversity conservation. The environment management plan of the projects envisages conservation commitment for certain threatened and endangered faunal species. The coffee table book provides a glimpse of these efforts made by NTPC since its inception. NTPC has learned to reap the benefits by integrating biodiversity concerns into business operations. Some of the perceived benefits are as under:

- Strengthen supply chain through eco-system services
- Gain better access to capital
- Improve brand image and reputation of Maharatna
- Social license to operate

The plantation programme of NTPC is likely to augment the carbon sinks and improve habitat for existing biodiversity. In order to attain environmental stewardship, NTPC aims to mainstream biodiversity in corporate decision making and inculcate biodiversity conservation as one of the core values.

Dr. Alind Rastogi
Executive Director (Environment)

पीयूष गोयल
PIYUSH GOYAL



विद्युत, कोयला एवं नवीन और नवीकरणीय ऊर्जा
राज्य मंत्री (स्वतंत्र प्रभार)
भारत सरकार
Minister of State (Independent Charge)
for Power, Coal and New & Renewable Energy
Government of India



Message

I am pleased to learn that NTPC is bringing out a Coffee Table Book on Biodiversity. The NTPC has successfully demonstrated its ability to deliver large projects and producing power in an efficient, reliable and affordable manner. With this book, another word gets associated with NTPC – *sustainable*.

The power sector in India has increasingly started focusing on becoming environment friendly. As part of CSR activities, NTPC has been preserving the flora and fauna, in and around its power stations. This book captures these long-term efforts by NTPC. I hope it will serve as an inspiration for other corporates to preserve the environment.

Piyush Goyal

प्रदीप कुमार पुजारी
सचिव
भारत सरकार
P. K. PUJARI
Secretary
Government of India



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May 19, 2016



Message

Biodiversity forms the cornerstone of ecosystem functions. The companies that are promoting biodiversity conservation are largely trusted by their stakeholders and typically enjoy strategic business opportunities in the markets.

The Coffee Table Book on Biodiversity provides a glimpse of efforts on part of NTPC which are in tune with sustainability targets. They reflect the deep rooted commitment of NTPC towards conservation of environment.

I wish team NTPC all success in its green endeavors.


(Pradeep Kumar Pujari)





A Maharatna Company



Introduction by CMD-NTPC

Friends,

I would like to present "The Good Earth" – the Coffee Table Book on Biodiversity. The book depicts our deep commitment to improve the green cover and conservation of flora and fauna.

Successful development of Dadri ash mound, nurturing green belts, medicinal plant gardens, fruit orchards in and around projects reflect our intention. NTPC has so far created carbon sinks by planting about 23 million trees. Further, in tune with provisions of INDC-2030, NTPC proposes to plant another 10 million trees in the span of next 10 years.

But, NTPC's journey in improving the bio diversity has only begun, as we look into the future, we must endeavour to actively contribute towards India's green growth.

Gurdeep Singh
Chairman & Managing Director, NTPC

Preserving Biodiversity. Protecting Earth.

The Earth's biological diversity is a global asset of tremendous value to present and future generations. Unfortunately the pace of species extinction, disturbance in food chain and perturbations due to climate change are impinging upon food and livelihood security of millions besides affecting the ecosystem. The damage to biodiversity is irreversible. Thus conservation efforts are needed at a much bigger scale.

In response to the growing commitment to sustainable development, the Convention on Biological Diversity an international treaty to sustain the diversity of life on Earth was evolved on December 29, 1993 with focus on conservation, sustainable use, and access to fair and equitable sharing of benefits arising from the use of genetic resources. Further, in 2000 a Cartagena Protocol on Biosafety (CPB) was adopted under aegis of the CBD whose objective was to ensure safe transfer, handling and use of living modified organisms resulting from modern biotechnology. Thereafter in 2012, a Nagoya Protocol on Access and benefit sharing was adopted and ratified by India. In COP-10 at Nagoya, a new global plan was evolved with 5 strategic goals. The ten year strategic plan with 20 defined targets was named as Aichi Targets. The United Nations General Assembly has declared 2011 to 2020 as the UN Decade on Biodiversity (UNDB) with a view to raise awareness about the importance of biodiversity and achieving of Aichi Targets. In tune with global commitments, India has evolved its 12 National Biodiversity Targets -2020.

Protected Areas

India is a mega-diverse country where just 2.4% of the world's area accommodates 7-8 % of all recorded species including 46,000 species of plants and 91,000 species of animals. In order to protect the biodiversity, India has developed a protected area (PA) network which has increased from 427 in 1988 to 690 in 2014 (102 National Parks, 527 Wildlife Sanctuaries, 57 Conservation Reserves and 4 Community Reserves) covering 5.07% of the geographical area. There are 23 marine PAs in peninsular India and 106 in islands. Six National Bureaus dealing with six genetic resources have been established. The genetic resources relate to plants, animals, fish, agriculturally important micro-organisms, insects and soil. Besides 9 Bio Reserves, 110 Medicinal Plant Conservation Reserves of 200 ha each have been established in 13 Indian states. Out of 6560 species, 315 spp are threatened medicinal plants. Bombay Natural History Society has identified 465 important bird areas. As on date 58 new IBAs have been proposed across 9 states of India.



Biodiversity Services

- Provisioning services which involve the production of renewable resources (e.g.: food, wood, fresh water)
- Regulating services which are those that lessen environmental change (e.g.: climate regulation, pest/disease control)
- Cultural services represent human value and enjoyment (e.g.: landscape aesthetics, cultural heritage, outdoor recreation, and spiritual significance)

- **Biological Diversity Act, 2002** was enacted for the conservation of biological diversity in India. The Act also provides mechanisms for equitable sharing of benefits from the use of traditional biological resources and knowledge.





Black Buck at NTPC Dadri

Types of Biodiversity

- **Taxonomic Diversity** usually measured at the species diversity level i.e. plant and animal varieties
- Ecological Diversity often viewed from the perspective of **Ecosystem Diversity**
- Morphological Diversity which stems from **Genetic diversity**

Biodiversity Hotspots

Renowned biologist Norman Myers coined the term "biodiversity hotspot" in 1988 as a biogeographic region characterized both by exceptional levels of plant endemism and by serious levels of habitat loss.

To qualify as a hotspot a region must meet two strict criteria: it must contain at least 1,500 species of vascular plants (> 0.5% of the world's total) as endemics, and it has to have lost at least 70% of its original habitat.

India is endowed with 4 biodiversity hotspots out of 34 hotspots identified globally

The biodiversity hotspots in India include:

- Himalayas
- North East India
- Nicobar Islands
- Western Ghats

There is a huge species diversity in India, with several of the species being endemic to their native ranges in India

Group	Number	% of world species
Mammals	350	7.6%
Birds	1224	12.6%
Amphibians	197	4.4%
Reptiles	408	6.2%
Fishes	2546	11.7%
Flowering plants	15000	6%

Sources: Indira Gandhi Conservation Monitoring Centre (IGCMC), New Delhi and IISc

Minimise impact on Biodiversity

NTPC is committed to minimize impacts on biodiversity through:

- Minimizing the land requirement for power plants
- Compliance with the siting criteria for thermal power plants published by MoEF & CC at the time of site selection.
- Locating the power plants away from protected areas (like national parks and wildlife sanctuaries) or non-protected areas rich in biodiversity
- Avoiding acquisition of forest land for the project, as far as possible to avoid Habitat Fragmentation
- Detailed environmental impact assessment study before construction of a project and implementation of environmental management plan during construction and operation phases
- Site specific ecological assessment studies, as and when required and
- Ecological improvements and habitat enhancement through afforestation and creation of water bodies

Value of a TREE



Green Endeavors of NTPC

- Biodiversity augmentation through Afforestation
 - Development of Green Belts
 - Roadside plantation/Avenue Plantation
 - Nurseries Development
 - Raising New Plantations
- Biodiversity Conservation
 - Medicinal Plant Gardens
 - Fruit Tree Gardens
 - Conserving Floral Diversity
 - Conserving Faunal Diversity
- Ecological Rehabilitation of Ash Dykes/ Mounds
- Development of Eco-parks and Gardens
- Keeper of Traditional Knowledge
- Mass Awareness Generation for Ecology
- Environmental Amelioration





Shri Piyush Goyal, Hon'ble Minister of State (Independent Charge) for Power, Coal and New & Renewable Energy, Government of India planting a sapling at NTPC Kaniha in the presence of other dignitaries.

Celebrating togetherness with Nature

Planted 23 million trees and continuing...

Focus on Biodiversity Conservation



Green Cover at NTPC Vindhyachal



NTPC Dadri



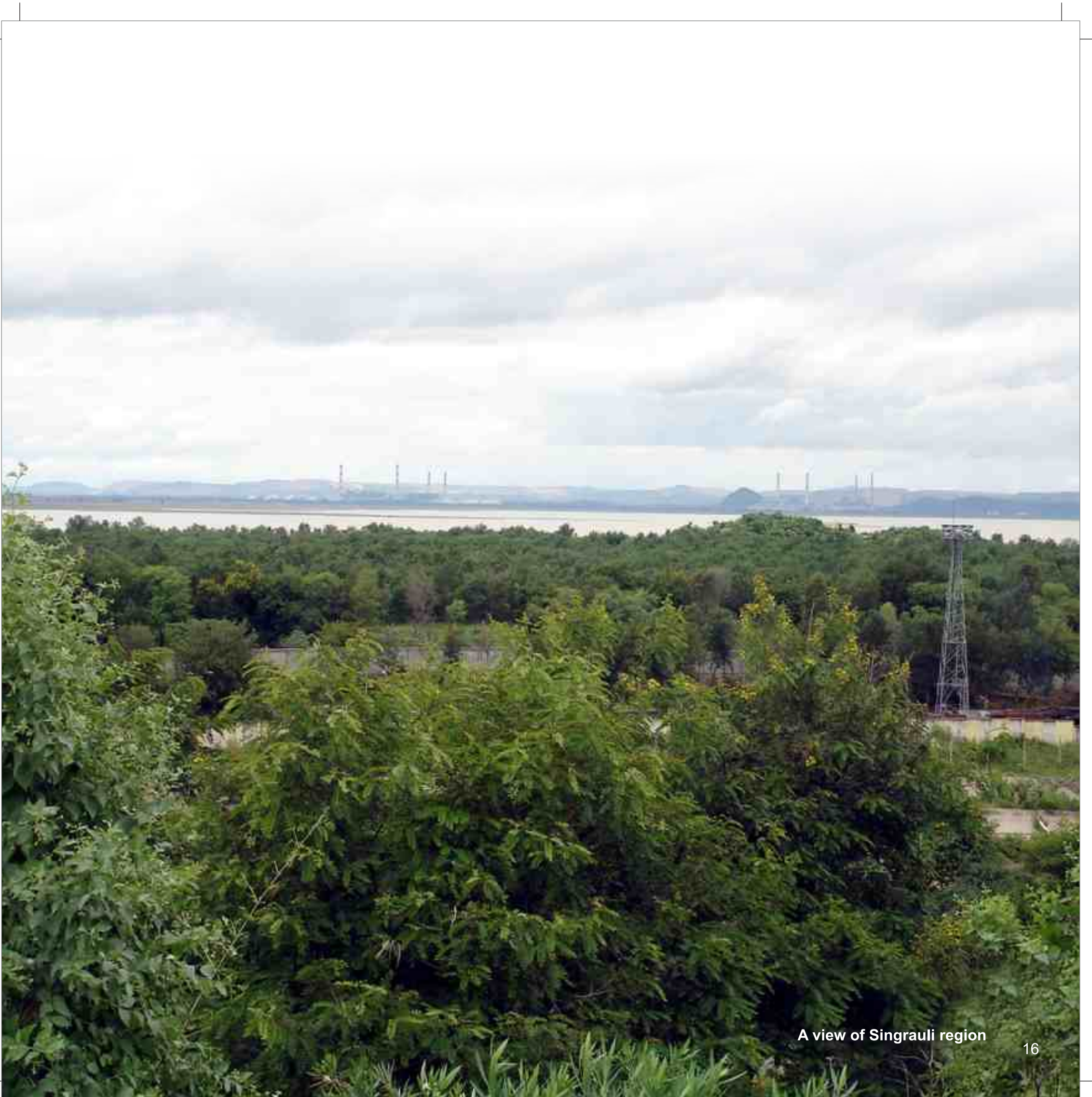
NTPC Ramagundam



NTPC Rihand

Green Belt





A view of Singrauli region

Roadside Plantations



NTPC Farakka

New Plantations



Sipat



Kudgi



Korba



Talcher



Mauda



Simhadri



NTPC Singrauli

Green Visakha Project, Simhadri

- Green Vishakha Project was initiated with a target of total 40 lakh tree plantations in Visakhapatnam.
- NTPC was assigned target of 5.50 lakh tree plantations in 5 years of which 3.18 lakh trees have already been planted.

Green Visakha Plantation



Nurseries Development



Biodiversity Conservation- Medicinal Plant Garden

Sanjeevani Herbal Garden, NTPC Simhadri



Fruit Tree Gardens



Sweet Lemon orchard at NTPC Rihand



Litchi tree at NTPC Kahalgaon



Crane berries at NTPC Kayamkulam



Mangoes at NTPC Vindhyachal



Vegetables at NTPC Farakka

Keepers of Floral Biodiversity



Flower Show at NTPC Farakka



Enriching Faunal Diversity at Dadri



Endangered Lesser Florican
(*Sypheotides indicus*)
spotted at Dadri.



Black winged stilts (*Himantopus himantopus*)

Resident Birds of Dadri



Drongo (*Dicrurus maro-cercus*)



Common Sandpiper (*Actitis hypoleucos*)



Hoopoe (*Upupa epops*)



Kingfisher (*Alcedo atthis*)



Sarus Crane (*Grus antigone*)



Moorhen (*Gallinula chloropus*)

A large flock of migratory ducks is captured in flight over a body of water. The ducks are in various stages of flight, with wings spread wide, showing different patterns of brown, grey, and white feathers. Some ducks have distinctive green and blue markings on their wings. The background consists of tall, golden-brown grasses and a clear blue sky. The water in the foreground is dark blue with some splashing. A semi-transparent blue box with white text is overlaid on the left side of the image.

Migratory Birds of Dadri





Northern Shoveller
(*Anas clypeata*)



Pond Heron
(*Ardeola grayii*)



Spot Billed Duck (*Anas poecilorhyncha*)

Samaspur Bird Sanctuary - Unchahar

Conserving habitat for Avian Fauna at Samaspur Bird Sanctuary, Unchahar



Great Indian Bustard conservation at Solapur



- Great Indian Bustard (*Ardeotis nigriceps*) is found in India and the adjoining regions of Pakistan.
- A large bird with a horizontal body and long bare legs, giving it an ostrich like appearance, this bird is among the heaviest of the flying birds.
- Once common on the dry plains of the Indian subcontinent, as few as 250 individuals were estimated in 2011 to survive and the species is critically endangered as per IUCN Red data list.
- Solapur project has taken up the task to conserve the species.



Black Buck conservation at Meja

- The Black Buck (*Antelope cervicapra*) locally known as “krisnha mrig” is an ungulate species of antelope native to the Indian subcontinent that has been listed as Near Threatened on the IUCN Red List since 2003.
- Meja project is pursuing its conservation



Gangetic Dolphins- National Aquatic Animal of India

- Gangetic dolphins (*Platanista gangetica*) are classified as Endangered on the 2006 IUCN Red List of Threatened Species and included in Schedule-I of the Indian Wildlife Protection Act, 1972.
- Kahalgaon project has initiated studies for its conservation in association with Bhagalpur University.



Conservation of Cheer Pheasant

- The Cheer Pheasant (*Catreus wallichii*), also known as Wallich's Pheasant is a vulnerable species of the pheasant family, Phasianidae, as per IUCN Red list of threatened species. It is listed in Appendix I of CITES.
- These birds lack the color and brilliance of most pheasants, with buffy gray plumage and long gray crests. Its long tail has 18 feathers and the central tail feathers are much longer and the colour is mainly gray and brown. The female is slightly smaller in overall size. They are found mainly above 6000 feet altitude and up to 10000 feet in summer.
- Koldam Hydro project in HP has taken up the conservation project.





Protecting the Giants

- As of 2010, 32 Elephant Reserves (ERs) extending over about 58,000 square kilometres have been formally notified by various State Governments
- North Karanpura project has attempted to improve the corridors as well as habitats for elephants in Jharkhand and adjoining areas.



Commitment

- Olive Ridley Turtles (*Lepidochelys olivacea*) conservation with the help of WII Dehradun

A unique Dadri Experiment - Turning Ash Mound into greens





Keepers of Traditional Knowledge

Express news Service-Villupuram dated 18.Feb, 2014,10.32 am. Mazhayampattu village wore a festive look as the most anticipated marriage between a Neem and Peepal tree was solemnised near Ulunderpet on Monday. Residents from 20 villages participated in the marriage ceremony which was followed by a grand feast. And attended by about 1500 villagers. Panchayat members said that the money collected would be spent on development works of Angalamman Temple. The faith amongst the villagers is that marriage of Neem and Peepal brings forth prosperity in the area.



Massive Plantation of Neem and Peepal taken up in Simhachalam

Rashi Vatika- Dadri



View of Nav Graha & Rashi Vatika at Unchahar



Nav Graha Vatika (Celestial Garden)

Graha	Tree	direction	Botanical name
Sun	Aak / Shwetark (आक / श्वेतार्क)	Middle	Calotropis Gigantea
Moon	Palash (पलाश)	South-East	Butea Monosperma
Mercury	Apamarg (अपामार्ग)	North	Achyranthus Aspera
Venus (शुक्र)	Gular / Anjeer (गूलर / अंजीर)(Fig)	East	Ficus Recemosa
Mars (मंगल)	Khadhir (Nalla Sandra)(खादिर)	South	Acacia Catechu
Jupiter (बृहस्पति)	Peepal / Ashvath (पीपल / अश्वत्थ)	North-East	Ficus Religiosa
Saturn (शनि)	Shami / Khari (शमी / खरी)	West	Prosopis Cenneraria
Rahu (Dragon's Head)(राहु)	Durva (दूर्वा)	South-West	Cynodon Dactylon
Ketu (Dragon's Tail)(केतु)	Kush / Darbha (कुश / दर्भा)(Thatch Grass)	North-West	Imperata Cylindrica



Touching Lives

Development of Eco-parks





NTPC Sipat



NTPC Rihand



NTPC Rihand



NTPC Talcher Kaniha



NTPC Unchahar



NTPC Farakka



NTPC Farakka

Awareness Generation



Mass Mobilisation







Transforming Lives through Income Augmentation

Launch of New Scheme –

“Plant a Tree- Take it free- JOIN THE GREEN ENDEAVOUR of NTPC.

Under the scheme the high yielding fruit tree seedlings are distributed amongst the villagers to enjoy the fruits as well as sell it into the market and augment their incomes.

Fruit Saplings Distribution



NTPC Ramagundam



NTPC Talcher Kaniha



NTPC Simhadri



NTPC Talcher Thermal

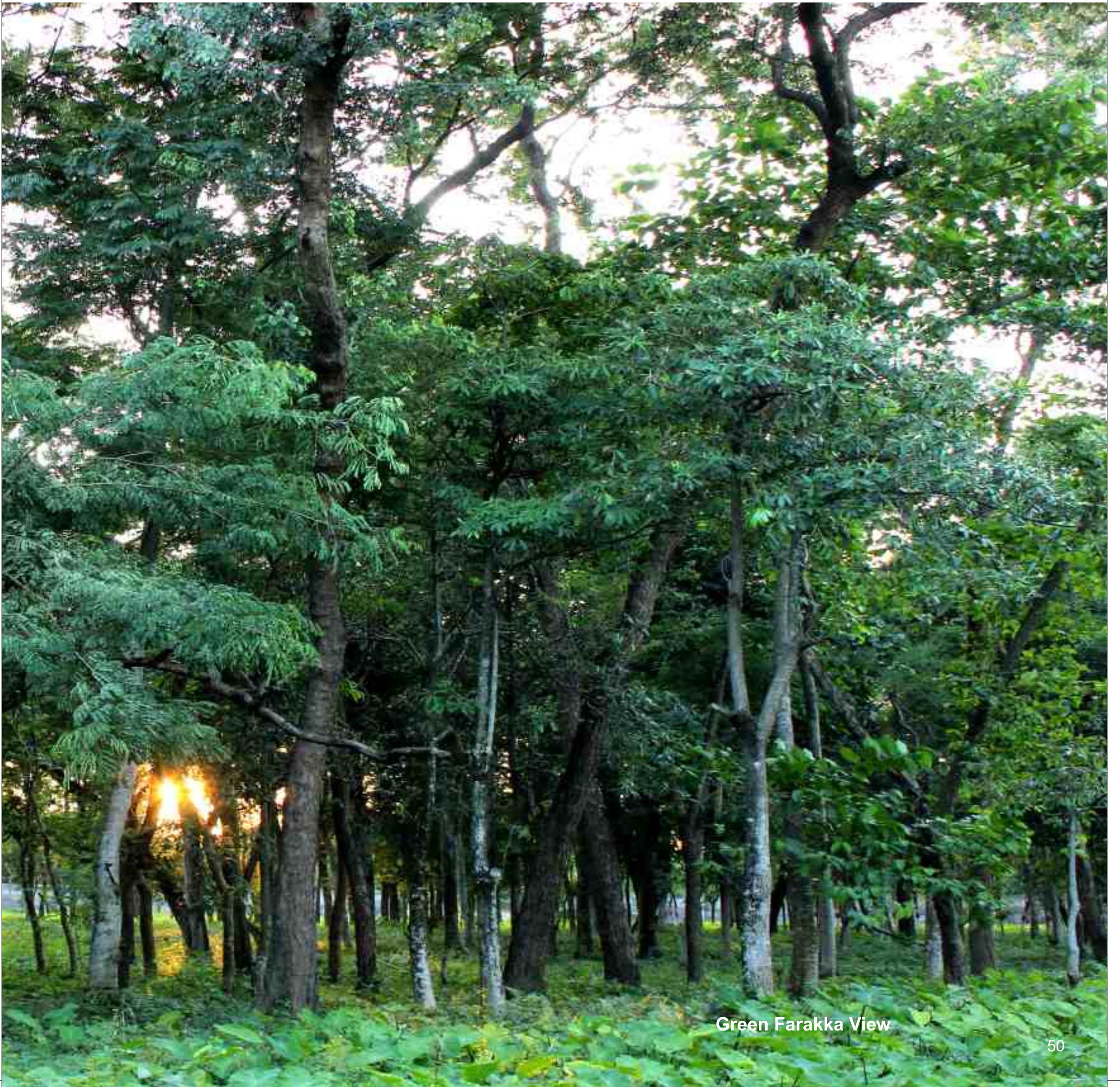


Afforestation Guidelines of NTPC

- Location of land for plantations- GIS mapping
- Identification of Agency
- Selection of species- Purpose driven
- Spacing of Plantations
- Approval Process
- Maintenance of Plantations
- Survival monitoring
- Audit & Record keeping
- Publicity
- Planning of activities
- Free distribution of fruit seedlings- Scheme
- Compensatory afforestation
- Handholding with Research Institutions
- Awareness generation

Intended Nationally Determined Contributions-2030

- To create 2.5- 3 billion tonnes of Carbon Sinks by 2030 through afforestation and increased Forest cover. NTPC aims to raise 10 million trees in next 10 years
- Approved “Afforestation guidelines” are in place
- Plant a tree, take it free. Join the green endeavor of NTPC.
- Emphasis is on cultivation of commercially important medicinal and aromatic plants through promotional schemes of national medicinal plant boards
- Bio-Diversity Conservation and Development



Green Farakka View

Afforestation Programme for next 10 years

Region	State	Station	Number of Trees in lakhs	Fruit Bearing Tree seedlings for free distribution by NTPC / Year
NR	Uttar-Pradesh	Singrauli	4.0	2000
		Rihand	4.0	2000
		Unchahar	4.0	2000
		Tanda	3.5	2000
		Dadri	3.0	2000
	M.P.	Auraiya	1.5	2000
	M.P.	Vindhyachal	5.0	2000
WR-I	Maharashtra	Mauda	5.0	2000
		Solapur	5.0	5000
	Karnataka	Kudgi	5.0	2000
	Rajasthan	Anta	0.5	2000
	Gujarat	Jhanor & Kawas	0.5	2000
WR-II	Chhattisgarh	Korba	4.0	2000
		Sipat	4.0	2000
		Lara	5.0	5000
	M.P.	Gadarwara	5.0	5000
		Khargone	5.0	5000
ER I	Bihar	Kahalgaon	3.0	2000
		Barh	3.0	2000
	Jharkhand	Northkaranpura	3.0	5000
	W.B	Farakka	1.5	2000
ER II	Odisha	Kaniha	5.0	2000
		T-Thermal	2.0	2000
		Darlipalli	5.0	2000
SR	Telangana	Ramagundam	5.0	2000
	A.P	Simhadri	4.0	2000
Total			100	72000

12 National Biodiversity Target 2020

Target	Details
1.	By 2020 a significant proportion of the country's population, especially the youth, is aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.
2.	By 2020 values of biodiversity are integrated in national and state planning processes, development programmes and poverty alleviation strategies.
3.	Strategies for reducing rates of degradation, fragmentation and loss of all natural habitats are finalized and actions put in place by 2020 for environmental amelioration and human well-being.
4.	By 2020 invasive alien species and pathways are identified and strategies to manage them developed so that populations or prioritized invasive alien species are managed.
5.	By 2020, measures are adopted for sustainable management of agriculture, forestry and fisheries.
6.	Ecologically representative areas under terrestrial and inland water, and also coastal and marine zones, especially those of particular importance for species, biodiversity and ecosystem services, are conserved effectively and equitably, based on protected area designation and management and other area based conservation measures and are integrated into the wider landscapes, covering over 20% of the geographic area of the country by 2020.
7.	By 2020 genetic diversity of cultivated plants farm livestock, and their 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.
8.	By 2020 ecosystem services, especially those relating to water, human health, livelihoods and well-being, are enumerated and measures to safeguard them are identified taking into account the needs of women and local communities, particularly the poor and vulnerable sections.
9.	By 2015, Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization as per the Nagoya Protocol are operational, consistent with national legislations.
10.	By 2020 an effective, participatory and updated national biodiversity action plan is made operational at different levels of governance.
11.	By 2020 national initiatives using communities' traditional knowledge relating to biodiversity are strengthened with the view to protecting this knowledge in accordance with national legislations and international obligations.
12.	By 2020 opportunities to increase the availability of financial, human and technical resources to facilitate effective implementation of the strategic plan for Biodiversity 2011-2020 and national targets are identified and the Strategy for Resource Mobilization is adopted.

National Pride

Tiger- *Panthera tigris*-
National Animal of India



Banyan- *Ficus bengalensis*
National Tree of India



Peacock , *Pavo cristatus* (Linnaeus),
National Bird of India



Gangetic Dolphin-*Platanista gangetica*
National Aquatic Animal of India



Mango- *Mangifera indica*
National fruit of India

Lotus- *Nelumbo nucifera*
National Flower of India



"THINK GREEN LIVE GREEN"

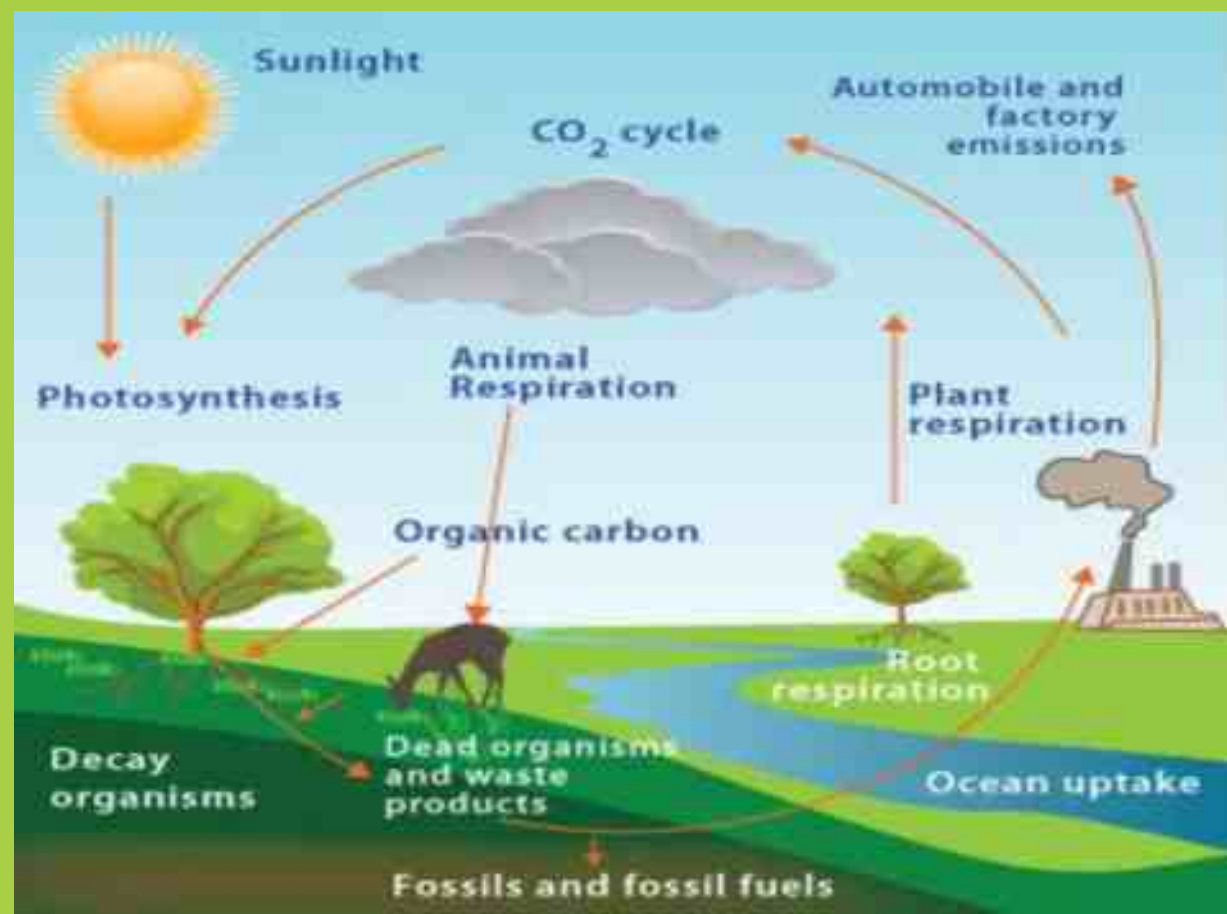


Let's pledge to leave a legacy of a green earth to our future generations. Let's save trees.



" Limit your need, minimize your greed, sow a seed, let the earth breathe"

Conserving the Ecological Cycle



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