

# NATURE BASED SOLUTIONS FOR INDUSTRIES

A hand is shown holding a small globe. The globe is a collage of various scenes: wind turbines, a rural farm with cows and sheep, a suburban neighborhood with houses and cars, a tropical beach with a palm tree, a pond with lotus flowers and a fish, and a wetland with white birds. The background is a dark, starry sky.

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# CLIMATE CHANGE IMPACT

- Earth will hit 3 °C of warming above pre-industrial levels by 2100
- Earth is facing both climate and biodiversity crises. A million animal and plant species are threatened with extinction, including man.
- **One of the answer could be adopting Nature based Solutions (NbS)**

# WHAT ARE NATURE-BASED SOLUTIONS

- NbS are actions that help address societal challenges and foster development by **working with nature** and anchoring solutions with local communities.
- Nbs help identify how healthy natural ecosystems can be protected, developed and utilized for services that benefit humans and build systemic resilience.
- These services can also help address global challenges like climate change, poverty and equitable growth in a cost effective manner.

# NATURE-BASED SOLUTIONS



Green space management



Knowledge building for sustainable urban transformation



Place regeneration



Health and well-being



Participatory planning and governance



Climate resilience



Biodiversity enhancement



Water management



New economic opportunities and green jobs



Natural and climate hazards



Air quality



Social justice and social cohesion

# NATURE-BASED SOLUTIONS FOR INDUSTRIES

- Industries can incorporate Nature-based Solutions such as renewable power generation, green procurement, climate resilient green infrastructure, water conservation and use of waste materials as part of their core business operations.
- Many industries are actively working towards revamping production processes through eco-innovations and circular economy approaches.

# NATURE - BASED SOLUTIONS



## Restoration

- Ecological restoration
- Ecological engineering
- Forest landscape restoration

## Issue-specific

- Ecosystem-based adaptation
- Ecosystem-based mitigation
- Climate adaptation services
- Ecosystem-based disaster risk reduction

## Infrastructure

- Natural infrastructure
- Green infrastructure

## Management

- Integrated coastal zone management
- Integrated water resource management

## Protection

- Area-based conservation

# Nature-based Solutions for Ecosystem related approaches

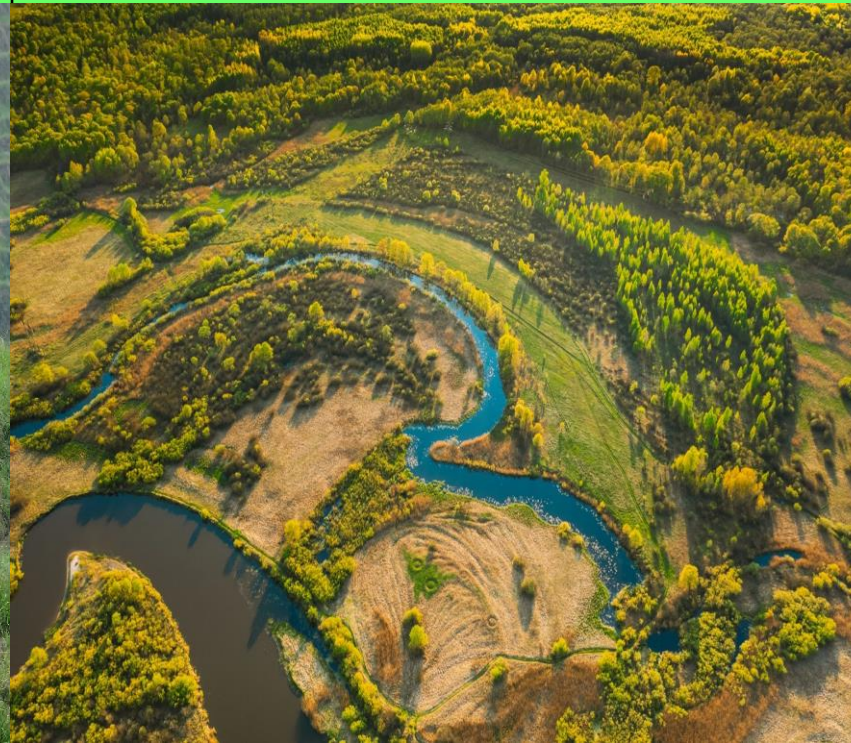
- ✓ Ecological restoration
- ✓ Ecological Engineering
- ✓ Forest landscape restoration
- ✓ Ecosystem-based adaptation
- ✓ Ecosystem-based mitigation
- ✓ Climate adaptation services
- ✓ Ecosystem-based disaster risk reduction
- ✓ Conservation approaches, including protected area management
- ✓ Integrated coastal zone management
- ✓ Integrated water resources management
- ✓ Natural infrastructure
- ✓ Green infrastructure

# EXAMPLES OF NATURE-BASED SOLUTIONS TO BE ADOPTED AND IMPLEMENTED BY THE INDUSTRIES IN THEIR CORE AND BUFFER ZONES

**Land, Soil and  
Water  
Conservation**



**Landscape and  
Watershed  
Restoration**



**Planting trees  
along a river  
to prevent erosion of the banks  
and siltation downstream**





# EXAMPLES OF NATURE-BASED SOLUTIONS TO BE ADOPTED AND IMPLEMENTED BY THE INDUSTRIES IN THEIR CORE AND BUFFER ZONES

**Adding Green  
Recreational space and  
Eco-Parks**



**Waterfront Parks  
along rivers and  
lakes/ponds**



**Green streets**

adding green infrastructure features to a street corridor contribute to a safer and more attractive environment for walking and biking



# EXAMPLES OF NATURE-BASED SOLUTIONS TO BE ADOPTED AND IMPLEMENTED BY THE INDUSTRIES IN THEIR CORE AND BUFFER ZONES

## Greenways

along rivers or other natural features  
- are protected open space corridors managed for conservation and recreation where people can explore and enjoy nature



## Restoring & Protecting Wetlands

can improve water quality and reduce flooding



## Storm Water Parks

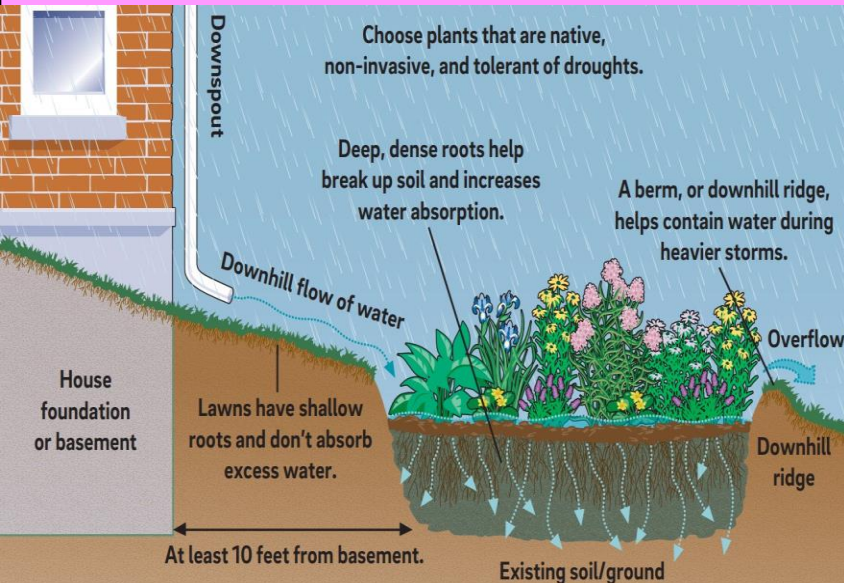
are recreational spaces that are designed to manage storm water



# EXAMPLES OF NATURE-BASED SOLUTIONS TO BE ADOPTED AND IMPLEMENTED BY THE INDUSTRIES IN THEIR CORE AND BUFFER ZONES

## Rain Garden

is a shallow, bio-retention vegetated basin that collects and absorbs runoff into the ground from rooftops, sidewalks, and streets. These can be added around homes, industries and businesses to reduce and treat storm water runoff



## Adding Bio-Swales

a ditch with vegetation and a porous bottom to hold soil laden water



## Green roofs

fitted with a planting medium and vegetation. It reduces energy costs for cooling the building



# EXAMPLES OF NATURE-BASED SOLUTIONS TO BE ADOPTED AND IMPLEMENTED BY THE INDUSTRIES IN THEIR CORE AND BUFFER ZONES

**Rainwater harvesting systems**

**Tree canopy/ Green belt to reduce storm water runoff**

**Permeable Pavements**  
allow more rainfall to soak into the ground. Common types include pervious concrete, porous asphalt, and interlocking pavers



# EXAMPLES OF NATURE-BASED SOLUTIONS TO BE ADOPTED AND IMPLEMENTED BY THE INDUSTRIES IN THEIR CORE AND BUFFER ZONES

## Storm water tree trench

is a row of trees planted in an underground infiltration structure made to store and filter storm water. Tree trenches can be added to streets and parking lots with limited space to manage storm water.



## Protecting or restoring a nearby Forest



## Restoring the productive capacity of degraded land

through 3-tier eco-restoration and biodiversity rejuvenation



# EXAMPLES OF NATURE-BASED SOLUTIONS TO BE ADOPTED AND IMPLEMENTED BY THE INDUSTRIES IN THEIR CORE AND BUFFER ZONES

**Integrated Coastal Zone Management**



**Mangrove restoration**



**Green Infrastructure**



# AUTHOR'S CREDENTIALS

- PhD in Environmental Science & Engineering - IIT-ISM, Dhanbad
- **Expert Appraisal Committee Member (Industry Sector), MoEFCC, Govt. of India at present**
- Climate safety leader mentored by Oxford School of Climate Change.
- Climate Change knowledge management; Develop sectoral adaptation and mitigation strategies, assessment of climate change risks and vulnerabilities; Strategizing Climate policy, Energy Transition pathways, Just transition models for the Indian industry & mining sectors; Strengthening institutional framework for environment and climate resilient management
- UNDP certified Ecosystem Restoration Expert
- UN ITAR certified expert in Sustainable Finance, Green Economy & Green Industrial Policy
- Worked with Ministry of Coal, Govt. of India as Domain Expert, Environment and Sustainable Development.
- 30+ years' experience in strategy development, project conceptualization, formulation and implementation for Sustainable Environmental Management. Worked with Coal India Ltd.
- Multi-disciplinary approach for environmental impact assessment, ecosystem conservation, restoration and environmental management is my strength. My exemplary environmental mitigation and protection achievements, specially, restoration of degraded ecosystems and mine reclamation in Jharia Coal mines were featured in various National-International Journals & Media.
- **Presently researching on Climate safety and Just transitions.**
- In Advisory role in Environment & Sustainable development domain for various institutions.
- Visiting Faculty for Coal India Ltd, IICM, FRI, IIRS, IIT-Dhanbad etc.

## **Notable achievements:**

- ✓ Impact assessment and formulating Environment Management plans for 100+ mining projects, their environmental management;
- ✓ Pioneered formulation of 'Cluster concept' for preparation of EMPs;
- ✓ Obtained environmental clearances to 100+ mining projects of Coal India Ltd.;
- ✓ Transforming 300+ hectares of degraded lands to lush green restoration sites; plantation of 3 million trees. Successful in re-establishing ecosystem services; biodiversity rejuvenation and biodiversity offsetting in degraded areas; Executed development of Eco-parks on waste lands; Conceptualised Eco-mining Tourism circuits. 3000+ students benefitted from eco-mining tourism;
- ✓ Execution of Mine Closure activities for 50+ mining projects.
- ✓ Worked on one of the World's largest Rehabilitation & Resettlement program, involving 5 lakh people and on their livelihoods; Instrumental in the mitigation of Coal Mine Fires and reduction of fire area in Jharia Coal mines.



**THANK YOU**

Data retrieved from various sources is duly acknowledged