Ecosystem Restoration and Rejuvenation of Waterbody for Sustainable Development

By

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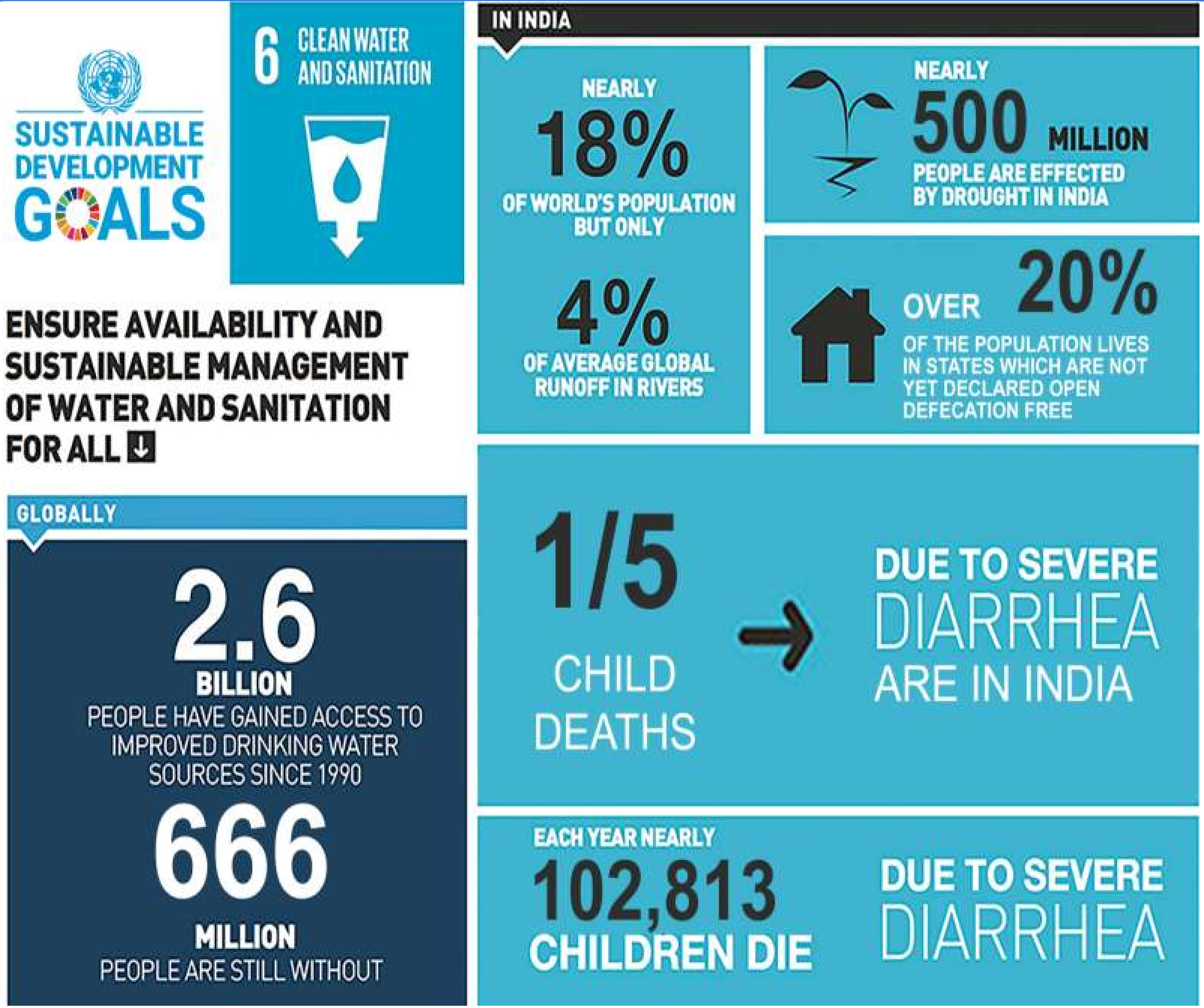
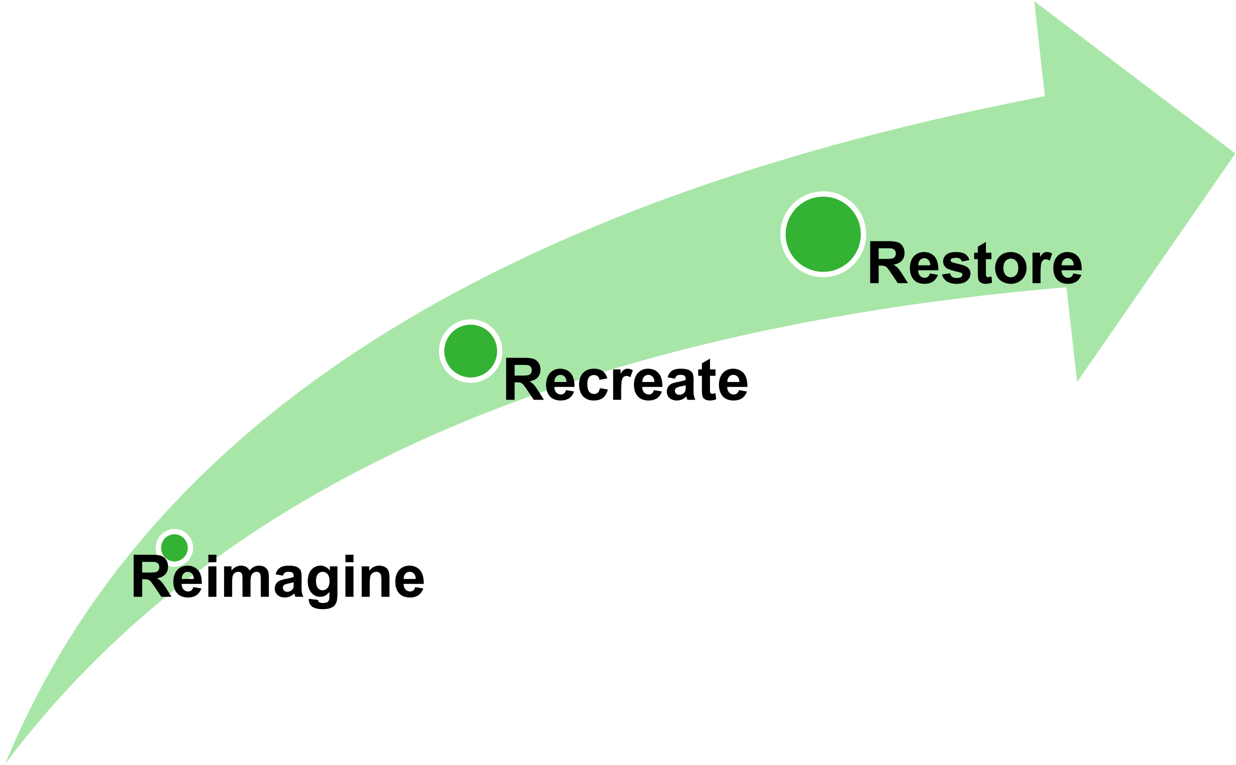


Ecosystem Restoration

1. Ecosystem restoration means **preventing, halting** and **reversing this damage to go from exploiting nature to healing it.**

2. Only with healthy ecosystems **we can enhance people's livelihoods, counteract climate change and stop the collapse of biodiversity.**



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UNITED NATIONS DECADE ON ECOSYSTEM RESTORATION 2021-2030

Agenda 2030: Sustainable Development Goals

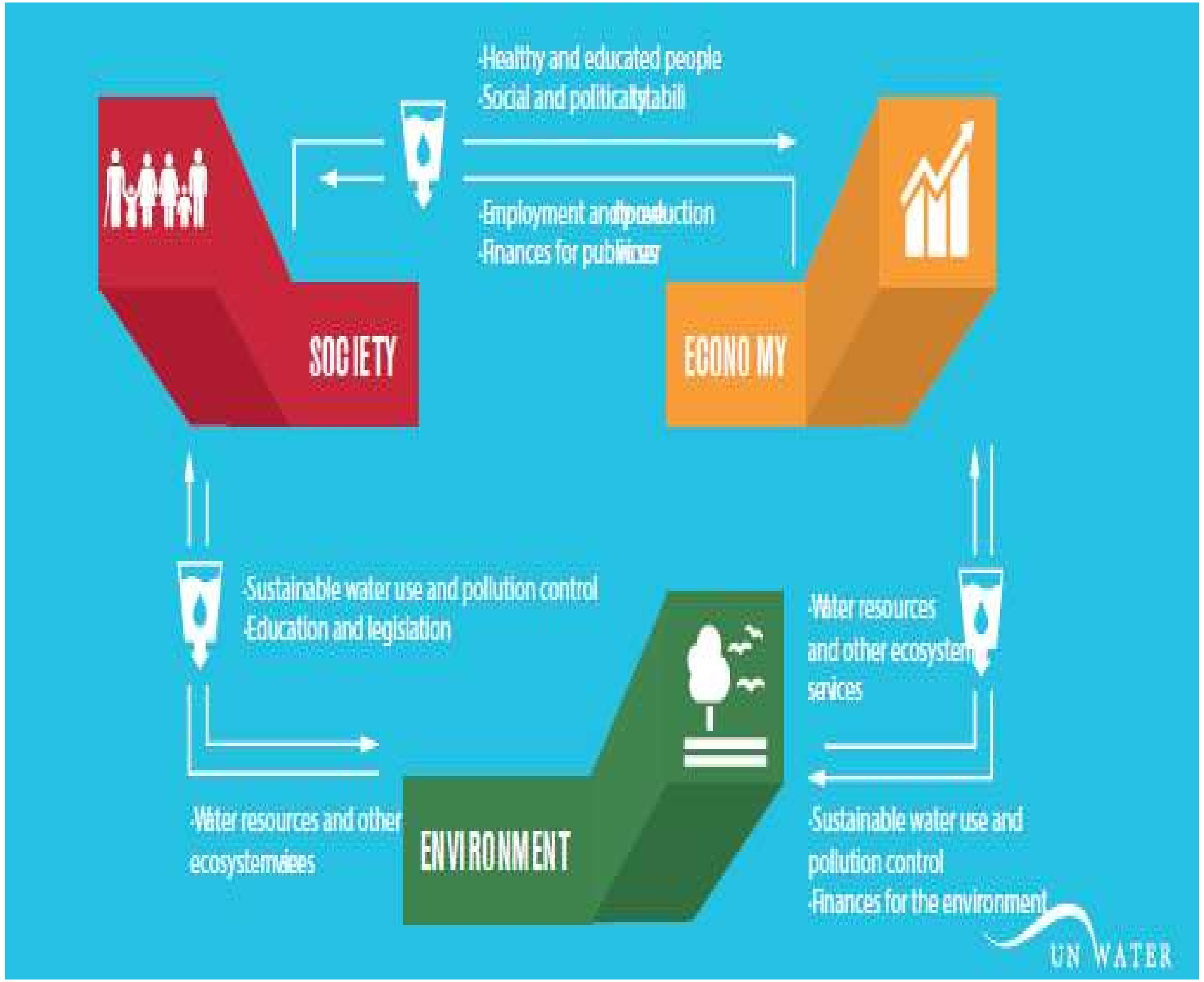
- Target to tackle the world’s most pressing social, economic and environmental challenges
- Developed by engaging with stakeholders including businesses
- Accountability of implementation to all sectors
- Time bound targets taken

Interlinkages with SDG 6

1. **Economic dimension-** Nearly 80% of all jobs globally are dependent on sustainably managed water resources and water-related services

2. **Social dimension-** The Goal on poverty calls for universal access to basic services, which include food, water and sanitation, energy and housing.

3. **Environmental dimension-** Improved water quality and wastewater management are mutually supportive of ecosystem and biodiversity protection, restoration and sustainable use of ecosystem goods and services.



"International Decade for Action – Water for Sustainable Development" (2018–2028)

Role of Business

1. Business can contribute **to the alleviation of water challenge by adopting a water stewardship strategy.**

2. Companies will be able **to make a positive contribution to improved water** and sanitation management and governance towards contributing to sustainable development.

3. **Adopting values and practices** that aim to **safeguard long-term availability** of clean water and the provision of sanitation for all stakeholders in a watershed.

Actions that Business can take

1. **Prioritize water efficiency across operations** by installing best practice technologies for water conservation, in water scarce areas.

2. **Development of innovative manufacturing processes** such that substances with high water contamination potential are eliminated and substituted with materials that are easier to remove from water systems.

3. **Integrate gray water back into building operations, reducing the amount of potable water** needed to flush toilets.

4. **Reduce the likelihood of groundwater contamination by treating and processing** all waste with exceptional precaution, according to local and federal guidelines.

5. **Educate stakeholders about appropriate water behaviors**, explaining global water quality and scarcity issues, thus attempting to shift the negative implications of the use phase associated with many consumer products.

6. **Invest in water and sanitation projects or restoration of water ecosystems** in under-served regions.

Case Study : Pond Rejuvenation

Conservation of biological diversity through CRM Bara Pond, a project on rejuvenation of water bodies

Historical Map of Bara Area

- Historical Google Map as on 01.01.2003 indicated that the open area, covering ~50 acres on Western side of CRM
- Another water body existed on the Southern side of the road, covering ~4 acres.
- Google map as on 28.02.2018 showed that the major water body had disappeared into a miniscule pond with full of algae, water hyacinths, weeds and shrubs.

Scenario Before Rejuvenation

1. Runoff Water from the CRM Plant, TSPDL and Upper Catchment on the Southern side flowed to this water body.

2. **Secondary Treated Sewage Water** (as per PCB norms) from the CRM plant and STP Pond on the Southern side was let into the water body site.

3. Effluent water with high **TDS (>500)** from CRM (effluent)

4. **Direct fall of rain water during monsoon period**

5. Surplus water from the **miniscule, shallow waterbody flowed through an Kutchha canal on the Western side of Pond and carried the fly ash along with runoff** to the Subarnarekha River on the Northern side.

A miniscule pond with full of algae, water hyacinths, weeds and shrubs

Scientific Studies and Innovation (1/2)

1. **Discussion with local community** members and executives of Tata Steel to understand the historical details of the site.
2. **Collection of available data on rainfall, temperature and wind conditions, maximum storage** levels, number of fillings and overflows, water quality, utilization of the lake by local community etc. from Tata Steel and user agencies
3. **Interpretation of the collected data** for its beneficial utilization.
4. **Calculation of water potential for the lake based** on the type and areal extent of the catchment, gradient of the terrain, feeder system, runoff water from the adjoining factories etc.
5. **Interpretation of Google Earth Maps and comparison of historical maps to understand the past history**, areal extent of the water bodies, restriction of surface area due to silting and other factors, natural landforms, drainage pattern, surface retention of the lake, catchment area of the lake, source water, diversion arrangement of runoff water, overflow arrangement etc.
6. **Contour survey to understand the level variations**, fix the inlet and overflow arrangements and diversion arrangement of runoff water from upper catchment area
7. **Geomorphological study to understand the local variations in topography**, gradient of the terrain, drainage pattern and movement of runoff water etc.
8. **Catchment area of the lake and the feeder channels were studied to calculate the water potential** and facilitate smooth flow of water from the upper catchment.

Scientific Studies and Innovation (2/2)

9. **Well inventory survey of the open wells**, bore wells to study the seasonal variation in water levels and infer the ground water conditions
10. **Hydrogeological study to assess the local ground water** conditions, local geology, weathering pattern, intensity and interconnectivity of fracture system etc.
11. **Study the soil profile to understand** the nature and texture of soil.
12. **Conventional water divining with copper wire** to find out the ground water flow lines, direction of ground water flow and potential zones of ground water recharge.
13. **Resistivity survey to understand** the immediate sub surface formations, depth of weathered portion, depth and nature of jointed and fractured formations
14. **Taking physical measurements** of the dimensions of the lake including the periphery of the lake
15. **Providing suitable engineering** design for the reservoir with an aesthetic appeal with meandering walkways, exquisite greenbelt with lawns, plants and trees, sitting arrangement, attractive landscaping with tree guards, statues etc.
16. **Provision of proper slope depending** on local soil conditions for slope stability.
17. **Pitching of side walls of the lake with** precast PCC slabs to avoiding erosion of side walls and providing weep holes with porous block.
18. **Desilting/Filtering arrangement** to minimize the flow of silt into the pond
19. **Study the quality of water from various sources and segregation of contaminated** areas to divert only water within the acceptable limits of Pollution Control Board (PCB) norms.
20. **Introduction of innovative aerators like imploders and attractive** fountains to improve aeration and quality of stored water.

Status of Recent Google Map (June 2021)

	AREA in acres	Avg Depth in meters	Storage Capacity M^3	Green Belt Area in Acres	No. Of Trees
POND 1	2	1.5	4150	1.98	2000
POND 2	10	3	75000	1.23	1200
POND 3	2	1.14	3200	0.50	1800
Total	**14**	**1.88**	**82320**	**3.71**	**5000**

Achievements under the project

1. Rain water harvesting of **82300 m3 (82300 KL)** water in the project site
2. Flow of contaminated water has been **treated and reduced to NIL**
3. **TDS of water has been reduced** and yield of water extraction structures increased
4. **Ground water table in the region started rising** with project implementation thus controlling the alarming depletion of ground water
5. Planting of more than **5000 plants** enhanced the **green canopy**
6. **Birds and butterflies** are attracted to water and plants so the biodiversity presence increased in the project area
7. Thriving population of **fishes attract migratory birds**
8. Clean and **green environment created** all around
9. It will help in mitigating the pollution affect from the movement of heavy inbound and outbound traffic

After Rejuvenation Project

Benefits from the Project

1. **Social Benefits: Involvement of local community** in the project during implementation have understood the importance of community participation, cleanliness, **good team work, safety standards** etc. Women fold were sensitized about the project. A beautiful social forest has also come into life in the project site which was upto the recent past a dump yard of fly ash, **breeding centre of mosquitoes and safe place for poisonous snakes.**

2. **Economic Benefits**: Local community **including women were involved in the project** which improved their **living standards**. It is becoming a **benchmark project for nearby industries**.

3. **Environmental Benefits:** Improvement in **Green Canopy of the entire project site is very significant** benefit of the project. Vigorously growing trees and plants and a panoramic green and clean atmosphere started attracting birds, butterflies, honey bees, dragonflies and other biodiversity. **A clean, green and serene atmosphere has been created.**

Glimpse of Biodiversity after Rejuvenation Project

Greenbelt development after Rejuvenation Project

Geotag Pictures of Rejuvenation Project

If you have any question then please contact:

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