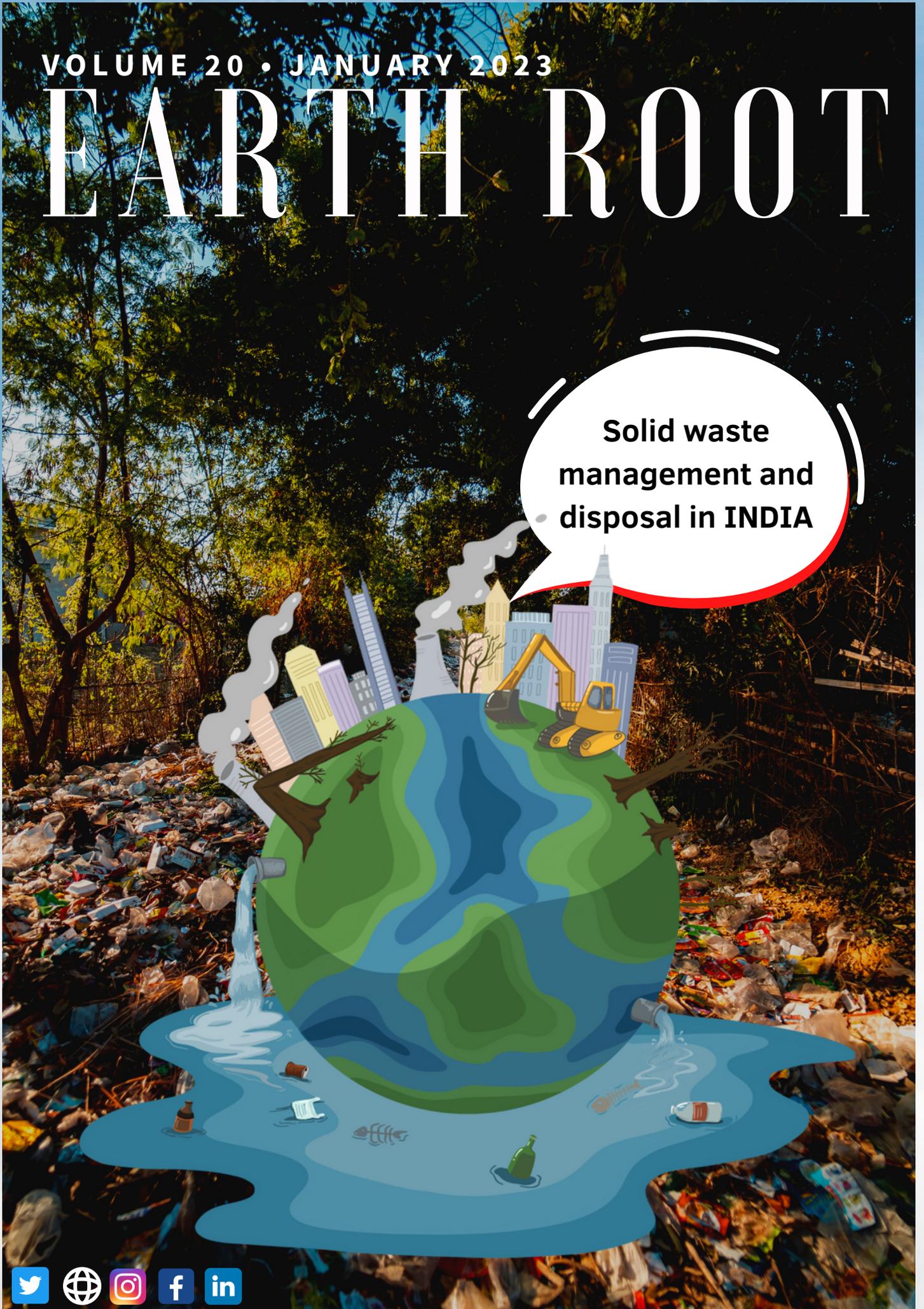


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EARTH ROOT

**Solid waste
management and
disposal in INDIA**



About E-magazine

“Earth Root” is an open access e-magazine in the discipline of Environmental sciences published by Earth Root Foundation. The aim of the e-magazine is to provide information and upgradation of knowledge about environmental issues on wider scale and to share ideas and resources to the readers. Using essential knowledge people can lead a healthy life, which is more sustainable and can connect with ongoing efforts for stopping catastrophically the climate change. E-magazine caters to all related environmental aspects ranging from big issues like climate change, renewable energy and pollutants in the atmosphere to the health of human and living beings on Earth. We also take topics of water resources and efforts and measurement to provide optimum use of it; including large scale atmospheric circulation linked with oceans and ecology.

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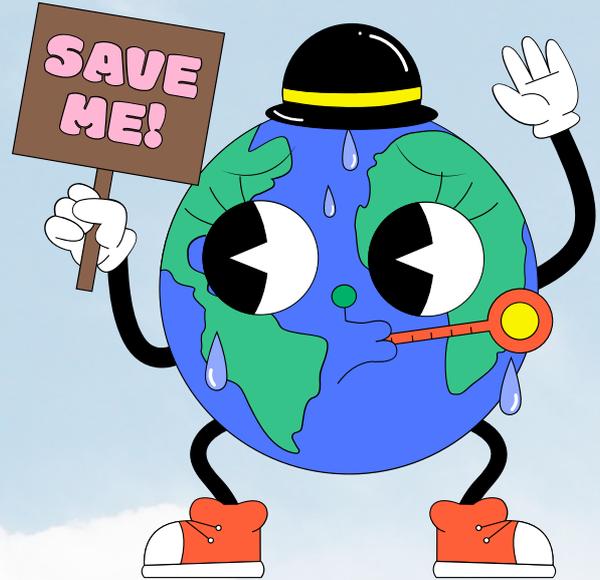
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WASTE MANAGEMENT: A PROBLEM NOT TO OVERLOOK

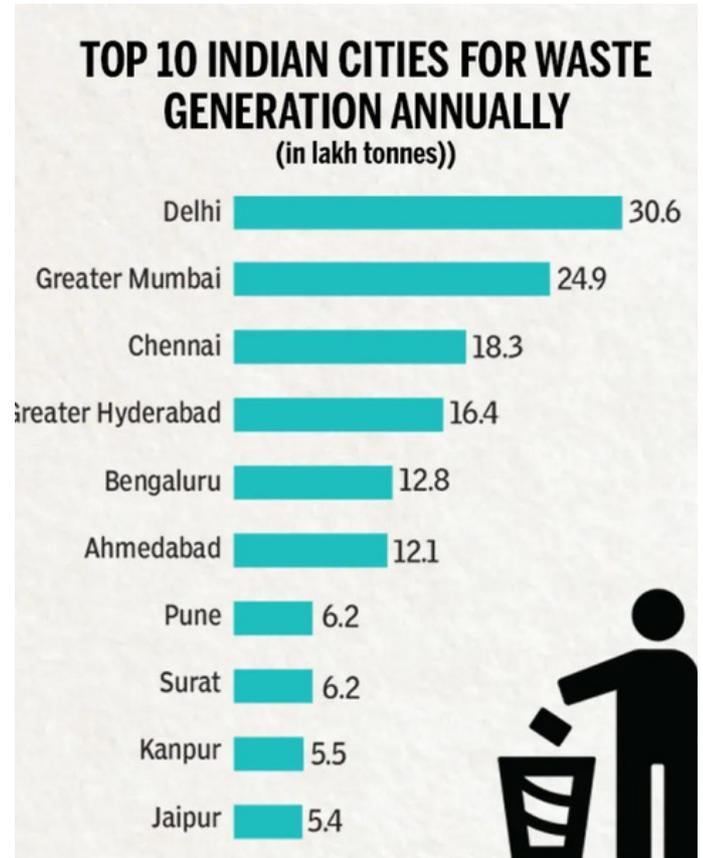
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The current pace of industrialization and economic growth has resulted in an enormous waste generation and continues to do so, especially in metropolitan cities. Hence waste management remains to be the most pressing issue in current times. Among waste management, the segregation of dry and wet waste is a serious problem. These not only generate revenue but also get rid of the bulk of the waste. The cost of separation and sorting, transportation, and recycling is very high. Our country produces millions of tons of waste each year, resulting in more landfills and incineration of waste that results in air and water pollution. The emission of methane gas from wet waste into the environment is also one of the problems that need to be addressed. It is one of the greenhouse gases which have more global warming ability than carbon dioxide. As the wet waste is not segregated from the dry waste, the methane emission from anaerobic oxidation often results in fire, producing more pollution.

This methane gas if harnessed properly can prove to be a useful energy resource, else it adds only to global warming. Segregating waste into dry and wet not only reduces burden on lands but also adds to the energy resources. The wet waste can be used for composting, adding to soil nutrition.

The mixed waste often leads to accumulated levels of heavy metal ions in the water bodies including surface water and groundwater between the dry and wet seasons



Other than heavy metal ions, the water bodies have often been found to be contaminated with microplastics which are again a serious health hazard. Wet solid waste management is a serious environmental problem in both developed and developing countries. The workers are exposed to many aflatoxins produced by fungi whose ingestion and inhalation can produce serious health effects.

In fact the wet water feedstock can be hydrothermally liquefied to produce biocrude. The manpower required to segregate dry and wet waste exceeds its use post-segregation in the form of energy resources.



Hence if the wastes are segregated beforehand, not only manpower would decrease exponentially, the utility of wet waste in generating energy and recycling dry waste would be more eco-friendly and energy efficient thereby reducing the carbon footprints. The wet resources include wastewater sludge, animal manure, food waste, and fats. In fact, some local communities have come up with the useful conversion of wet waste into economically feasible products like bio enzymes.

One of the major challenges in waste management comes through the disposal of Lithium-ion batteries. They are often tossed into the trash and end up in landfills where they decay and leak. When leaked they release chemicals into the soil and contaminate groundwater and surface water.

In fact, the disposal of batteries in electric vehicles is the biggest issue we are walking on as we progress towards development. Waste management can be effectively dealt with through optimum awareness and voluntary involvement of people in the overall conservation of the environment.

There is also a menace of discarded tires that poses a serious concern for the environment. Researchers have come up with many ideas to recycle tires but the cost of recycling again burns hole in the pocket. In Delhi, many waste energy (WTE) plants have been set up but they are only effective up to 13% of their capacity since the useful waste that could be fed into WTE machines is not segregated. Poor waste management leads to increased infections, breathing problems, decreased immunity, and diseases like asthma. The appropriate methods for waste collection to waste disposal should be adopted by spreading awareness about waste handling and increasing the infrastructure to handle the waste. This will prevent occupational hazards for the waste pickers.

DID YOU KNOW ?

•As of 2021, the world generated over 2.01 billion tons of municipal solid waste annually. Each year, on average, 1,500 pounds of waste per person goes into a landfill.

NATURAL SCIENCES: BIODIVERSITY AND HUMAN CIVILIZATION

Ayushi

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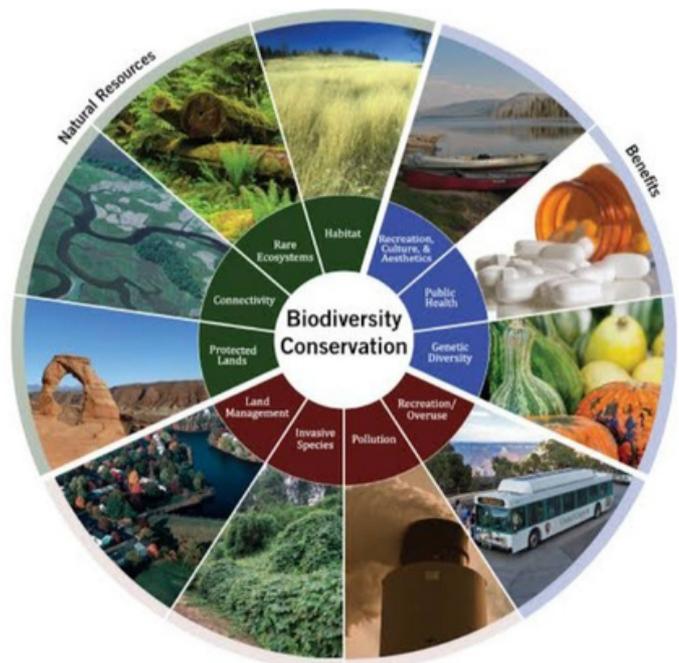
There is no doubt that human civilization had a negative impact on biodiversity. Since the industrial revolution, overfishing and hunting, the destruction of ecological habitats through agriculture and urban corridor expansion, the use of pesticides and herbicides, and the release of their toxic compounds into the environment have all taken their toll, particularly on vertebrates. Though many animal and plant species have adapted to the new stresses, food sources, predators, and threats in urban and suburban environments, where they can survive in close proximity to humans.

For conservation efforts and help to soften the environmental impact of business parks, housing, roads, and waterways, in fact, these types of construction can enhance biodiversity and encourage species to colonize urban areas by creating ecological corridors and networks to circumvent obstacles, thereby providing access to favourable habitats. Small mammals, for example, can cross major roads and railways by using dedicated pathways that are constructed within existing tunnels and bridges. Furthermore, urbanization does not preclude the development of teeming habitats; rather than being confined to remote areas as wildlife parks.

Human activities are causing major changes in biological communities worldwide. These changes can harm biodiversity and ecosystem function.

To sum up, human civilization is having a negative impact on biodiversity, and this should be controlled to serve our long-term survival. Else, we are going to face major challenges to our existence. A great saying states, "Nature is our friend, do not hurt it." We have to take it seriously and should imply sustainable development and civilize carefully for our own good.

The term 'ecological civilisation' became more popular and subject of concerted research when President Hu Jintao of the People's Republic of China mentioned it in his 2007 work report to the 17th Communist Party Congress. Then, President Xi Jinping upheld ecological civilisation as the key concept used to "green" the institutions of the Party-state. It was also ratified in the Constitution of the People's Republic of China in 2018, and a large Ministry of Ecology and Environment was created in March 2018.



SOURCE: Earth.org

SOLID WASTE MANAGEMENT AND DISPOSAL IN INDIA

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The solid waste generated by the human is growing day by day at a pace that is completely unexpected, the rise of solid waste is a big burden on our environment, although authorities designed to deal with this issue is working on it for a very long time the methods used by them for the disposal of waste is certainly not efficient enough to accommodate this much waste. Improper waste disposal and management, which includes public littering, lack of waste segregation, uncontrolled collection and disposal, and poor waste treatment practices, have greatly impacted the world. According to a World Bank report, 2.01 billion tons of municipal solid waste is generated every year across the world, out of which it is estimated that 33% is not managed properly, Due to this gap a large percentage of the solid waste ends up in the open landfills completely untreated causing several health problems to people, especially among the poor who reside near landfills. The mismanaged waste on the roadside may lead to the transmission of diseases and affect public health. Animals also get affected by consuming plastics and toxic waste. The waste accumulation over time pollutes water bodies and ultimately disturbs the natural balance of the environment.

Improper waste disposal and management directly affect the economy of the country by reducing the income that could be generated through tourist destinations and spots maligned by the waste problem. Also, greenhouse gases emitted from waste contributed to climate change as well. According to a report published in 2016, solid waste generates 5% of global emissions.

According to CPCB(Central pollution control board) India, the waste generated in India per capita has increased from 0.26kg/day to 0.85kg/day. Out of which about 90% of the waste is disposed of without treatment.



CHALLENGES IN WASTE MANAGEMENT

Increase in population, commercial activities, Heterogeneous solid waste effects waste is treated and managed in India. Handling, transportation and treatment of waste are the major challenges for municipal authorities as well.

Open dumpsites and landfill fires are serious concerns as they cause health risks such as respiratory disease, Malaria, and Dengue environmental problems are a serious concern as they cause health risks such as respiratory disease, Malaria, and Dengue, and environmental problems such as air, water, and soil pollution.

Lack of awareness about waste management is also a big problem in India. Using the same bin for both dry and wet waste makes it difficult to segregate, unorganized waste collection systems and lack of land for waste disposal are some other factors responsible for growing waste problems.

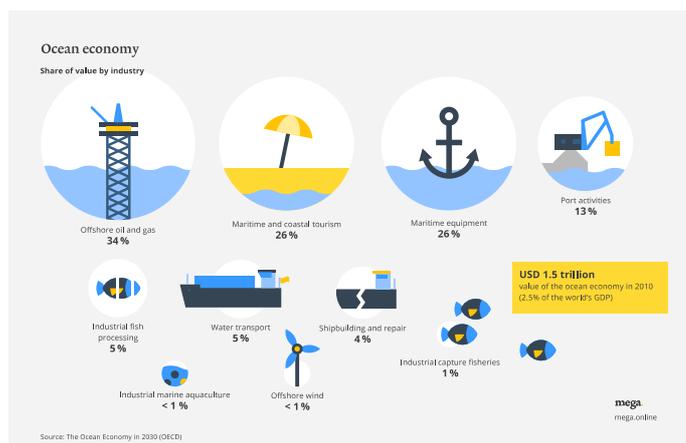


A STEP TOWARD CHANGE

Governments all around the globe are taking measures to deal with the issue of solid waste management and disposal, startups are coming up with innovative ideas for waste disposal, community-based awareness programs, incentive-based programs, new technologies, and research on biological solutions.

Countries like Germany and Sweden are examples of how a proper structure can be built to tackle this issue, educating the population and developing innovative waste management strategies. A color code-based waste collection system and recycling practices are now part of a daily routine. It has helped in developing a culture of waste management among the communities.

In India Indore did something similar to Germany implementing a color code waste segregation system, QR based waste collection system interconnected waste to energy plant helping Indore to become India's one of the cleanest cities, Indore has also converted its landfill site into public place which is generating an additional source of income for the government.



INDIAN GOVERNMENT AND WASTE MANAGEMENT

The Indian government has taken some strong measures and carried out policy changes to solve the waste management and disposal challenge in the country. The Swachh Bharat initiative has been one of the most powerful nationwide campaigns that have touched the nerve of every individual to contribute to the better collection, segregation, handling, and disposal of waste in India. For FY 21, Rs 12,300 crore budget allocations are proposed for Swachh Bharat Mission which is further aimed to support segregation, sustainable waste processing, and waste disposal mechanisms.

Multiple initiatives, schemes, and awards have been launched such as Swachh Survekshan, and Swachhta Hi Seva, to involve citizens in the waste management drive. According to reports, the door-to-door waste collection has increased to 80% from 53%. The waste processing capacity has grown from 24% to 34%. It is also worth noting that about 45-50% of waste comprising solid waste is organic, which can have a significant impact on how waste is treated and disposed of. If we look deep into the type of solid waste we can find that the carbon and nitrogen ratio and the compostable fraction are more than 50%. It means that organic waste is suitable for composting.

THE BLUE ECONOMY AND CLIMATE CHANGE

Dr. Vivek Panwar

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The global economy benefits considerably from the \$1.5 trillion annually estimated contribution of coastal communities, which is expected to increase to \$3 trillion by 2030. Targeted support for important industries, such as fisheries and aquaculture, tourism, energy, shipping and port activities, seabed mining, as well as cutting-edge fields like renewable energy and marine biotechnology, is necessary to ensure ocean ecosystem health, support livelihoods, and promote economic growth.

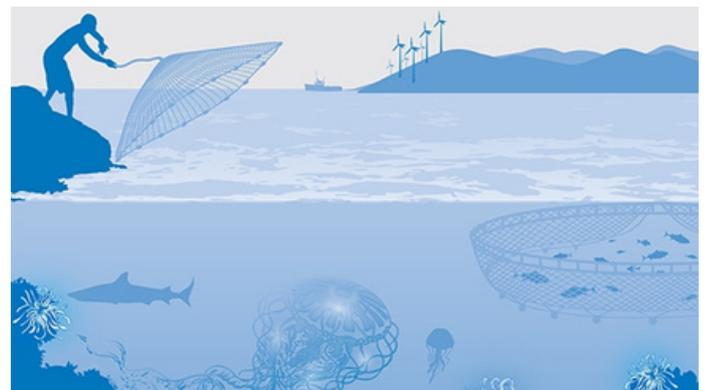
The World Bank describes the blue economy as "the sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while protecting the health of the ocean ecosystem," despite the fact that there is no one, widely agreed-upon definition of the word.

The three pillars of sustainability—environmental, economic, and social—are given equal weight in a blue economy. Understanding the distinction between an ocean economy and a blue economy is crucial when discussing sustainable development.

Coral reefs, mangroves, seagrass meadows, and wetlands all provide essential ecosystem services like coastal protection and carbon sequestration in addition to tangible products and services.

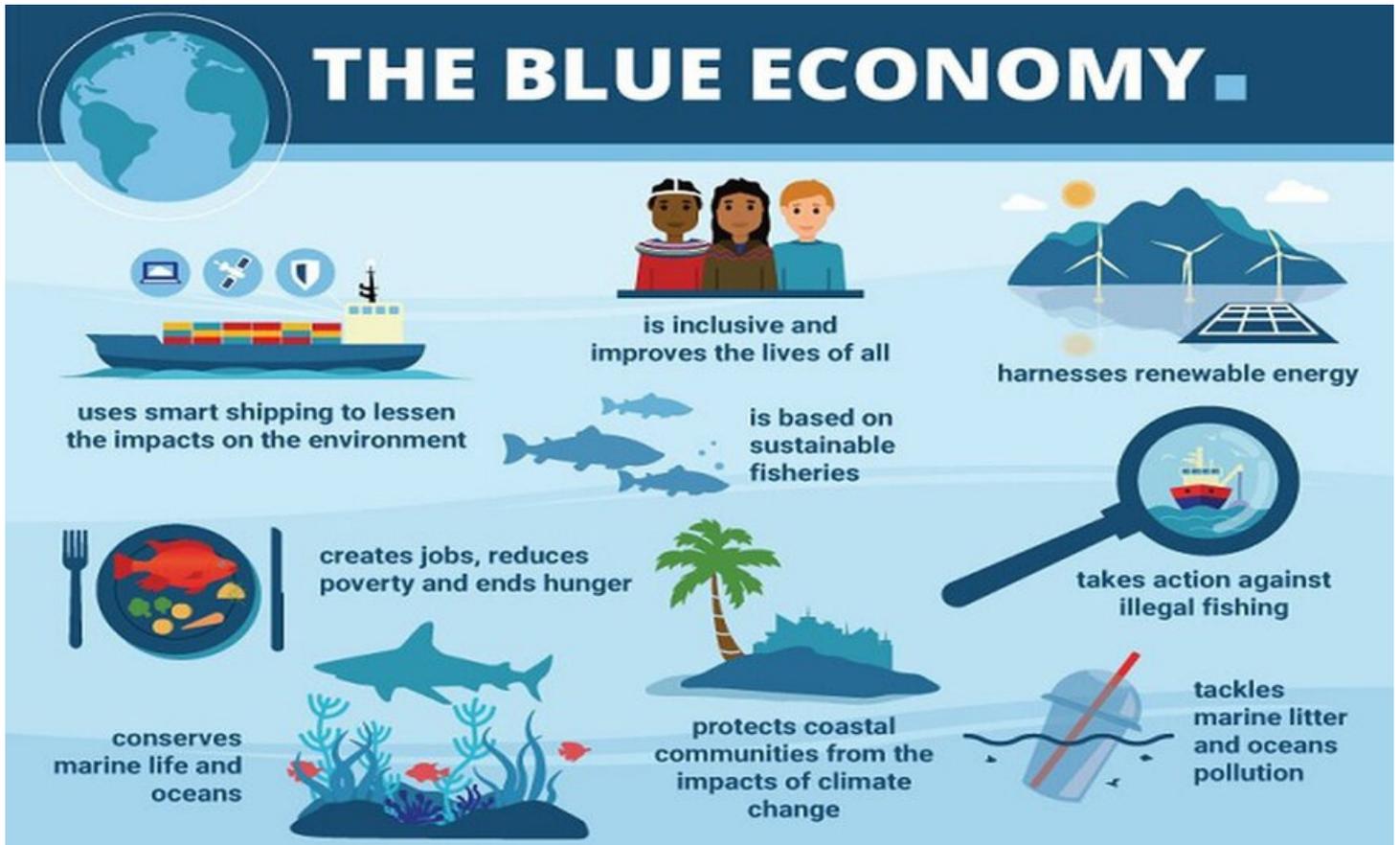
Even as we continue to lose land-based trees, the blue economy is playing a bigger and bigger role in the effort to mitigate climate change. Mangroves, tidal marshes, and sea grass beds are examples of shallow coastal water habitats that are increasingly recognised as being crucial components of our strategy for managing vital natural carbon sinks.

It has been discovered that these important coastal habitats are more efficient than terrestrial forest systems at long-term carbon sequestration and fix carbon at a rate that is substantially higher per unit area than land-based systems. These various ecosystems are ecologically interconnected; the sum of their contributions offers higher resilience than the sum of their individual contributions.



Over 90% of the excess heat produced by human-generated greenhouse gases and about 23% of the carbon dioxide emissions caused by humans are absorbed by the oceans, which are essential to mitigating climate change.

By enabling marine sectors that contribute to climate change mitigation, marine spatial planning can assist nations in making the transition to low-carbon solutions. Examples include the use of offshore renewable energy, the bunkering of low-carbon fuels, the decarbonization of port infrastructure and maritime transportation, the sequestration of carbon by marine and coastal ecosystems (also referred to as blue carbon), and the regulation of greenhouse gas emissions in oceanic sectors.



By preserving and restoring the biodiversity and ecosystems necessary to shield populations from the consequences of climate change, maritime spatial planning can help identify nature-based solutions and hybrid infrastructure (mixed natural and artificial solutions). For instance, 50% of the carbon deposited in marine sediments comes from marine environments like sea grass and mangroves. Healthy coral reefs reduce wave intensity by an average of 97%, providing protection from climate risks. The extensions of marine protected areas to incorporate carbon-storing habitats and the preservation or restoration of native species that sequester carbon are two examples of how marine spatial planning might support more common solutions.

The food security of coastal communities that depend on fish is directly at risk due to climate change's disruption of ocean patterns, which affect fish distribution and migration patterns. To improve adaptability to these effects, marine spatial planning can promote the creation of protected zones and fish management strategies.

Climate-informed marine spatial planning is more crucial than ever to create transformative and implementable solutions as the momentum surrounding ocean and climate action keeps growing. As a result, these solutions will enhance marine and coastal governance and support nations in achieving resilient and sustainable growth.



MOVIE RECOMMENDATION: RACING EXTINCTION (2015)

A documentary that follows undercover activists trying to stave off a man-made mass extinction.

Scientists predict we may lose half the species on the planet by the end of the century. They believe we have entered the sixth major extinction event in Earth's history. Number five took out the dinosaurs. This era is called the Anthropocene, or 'Age of Man', because the evidence shows that humanity has sparked this catastrophic loss. We are the only ones who can stop it as well. The Oceanic Preservation Society, the group behind the Academy Award® winning film *THE COVE*, is back for "Racing Extinction". Along with some new innovators, OPS will bring a voice to the thousands of species on the very edge of life. An unlikely team of activists is out to expose the two worlds endangering species across the globe. The first threat to the wild comes from the international trade of wildlife. Bogus markets are being created at the expense of creatures who have survived on this planet for millions of years. The other threat is all around us, hiding in plain sight. There's a hidden world that the oil and gas companies don't want the rest of us to see. Director Louie Psihoyos has concocted an ambitious mission to call attention to our impact on the planet, while inspiring others to embrace the solutions that will ensure a thriving planet for future generations.

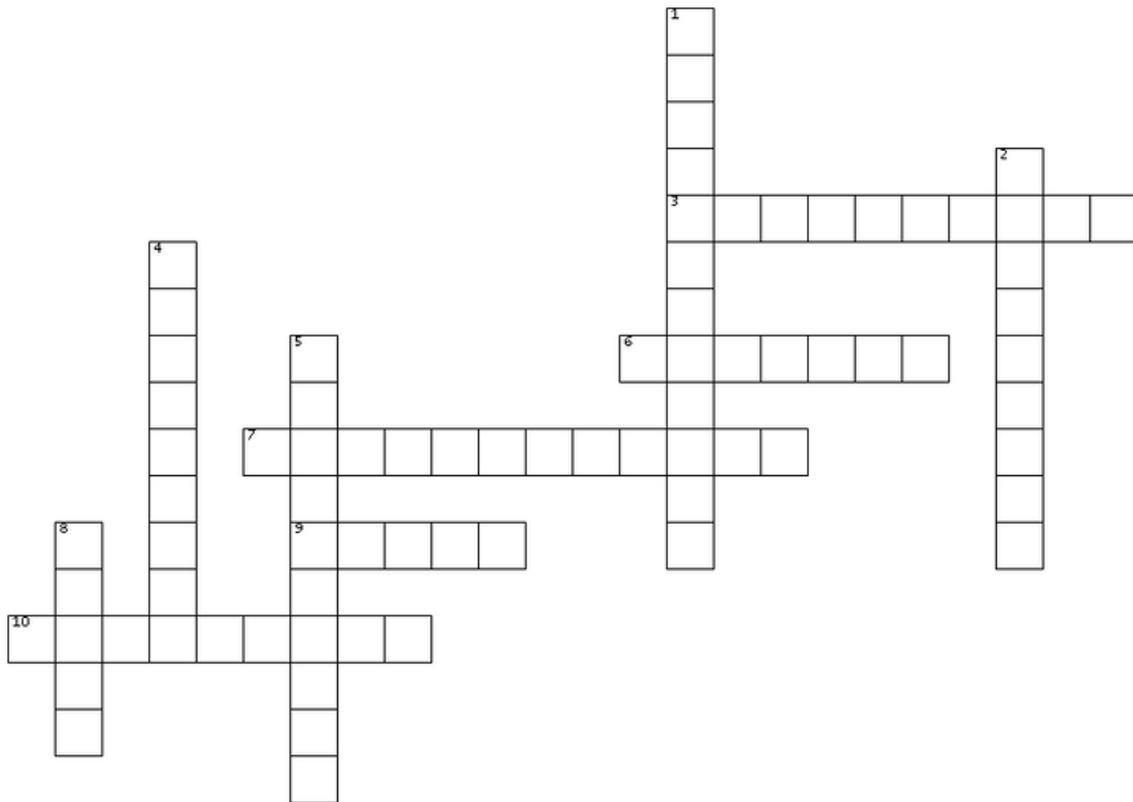


Source: imdb



Utilizing state-of-the-art equipment, Oscar-winner Louie Psihoyos (*The Cove*) assembles a team of artists and activists intent on showing the world never-before-seen images that expose issues of endangered species and mass extinction. Whether infiltrating notorious black markets with guerrilla-style tactics or exploring the scientific causes affecting changes to the environment, *RACING EXTINCTION* will change the way we see the world and our role within it.

CROSS WORD



ACROSS

3. The state or situation that results when something (such as a plant or animal species) has died out completely.
6. The place or type of place where a plant or animal naturally or normally lives or grows.
7. The protection of animals, plants, and natural resources.
9. An environment that has all the things that a particular plant or animal needs in order to live.
10. The organisms that interact with one another in a similar location.

Down

1. The protection of animals, plants, and natural resources.
2. The part of the Earth in which life can exist, whether on land, in the air, or in water.
4. Everything that exists in a particular environment.
5. An industrial or commercial site that is idle or underused because of real or perceived environmental pollution.
8. A form of oxygen that is found in a layer high in the earth's atmosphere.



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