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Newsletter Theme: In Pursuit of Sustainable Development Goals (SDGs): Challenges & Opportunities

CONTENTS

From Director's Desk

The UN Sustainable Development Goals (SDGs) have provided a transformational roadmap to the World up to 2030 for ending poverty, protecting the environment, and achieving prosperity. The universal and integrated approach of SDGs makes them suitable for mainstreaming in different sectors. Ban Ki-Moon, the former UN Secretary-General emphasized that SDGs promote interdependency and interlinkages among various dimensions of sustainability and stakeholders which is a prerequisite to realizing the people's agenda. In the last six years governments, businesses, civil societies, and academic institutions have integrated SDGs into their developmental agenda. However, the impact of businesses is more on resource depletion and pollution generation. Many industries have mapped their impacts and identified suitable sector-specific SDGs for implementation but for generating positive outcomes effective planning and financial resources will play an important role.

As we entered the third year of the Covid 19 pandemic, we observed that it has put enormous effects on people's lives, and livelihoods and on realizing the 2030 agenda for sustainable development. But this difficult time has imparted great learning in coming out of current and future challenges. Now, it is urgent to identify the progress of the goals implemented and reaffirm our commitment to achieving our developmental agenda. The current issue of 'The Environment Management' is an effort to identify and discuss sector-specific SDGs and highlight positive case studies for emulating them for the creation of multiplier effects.

Happy reading!

Dr. Seema Mishra

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SDG 2030, the progress, challenges, opportunities and recommendations

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The UN General Assembly in 2015 approved the Agenda SDGs 2030 which was agreed upon and accepted by 193 countries. It is aimed at taking action in solidarity to end poverty, protect the planet, and work towards peace and prosperity for all people[1]. The 17 goals of Sustainable development are interconnected and demand a balance on the social, economic, and environmental aspects[2].

India has not only played an instrumental role in the development of the agenda but is also playing a leading role in the achievement and success of the goals on a global scale. The Government of India's commitment towards achieving these goals is also reflected in its policy initiatives and through the direct involvement of the premier think-tank NITI Aayog[3].

The progress made on the goals is monitored through SDG Index at the national and global levels. NITI Aayog launched the baseline Index edition in 2018. Since then, there has been considerable improvement in robustness and performance in the 2nd Edition (2019) and 3rd Edition (2021). The scores on the index provide a measure of performance on various SGDs.

The country has outperformed the national index but lags on the Global Index in performance over the last year[4].

There are multiple reasons for this, but the major hindrance to the progress specifically for most of the developing countries has been due to COVID-19, and the challenges are further exacerbated by the Ukraine Conflict[5] and climate crisis.

We have seen all sorts of challenges on the financial front, there is a rise in debt, a decrease in FDI and trade, there are decreased earnings. On the social front, there is a rise in poverty, fallen education standards, increased domestic violence, and an impact on health. There is the degradation of the environment and structural inequalities[6].

There is a Great financial divide that cripples the developing countries' response to crisis and investment in sustainable development[7]. The report 'Bridging the Finance Divide' recommends actions in three areas to bridge the gap: (i) Addressing the financial gap and rising debt risk urgently, (ii) Aligning the financial flows to sustainable development, and (iii) Enhancing transparency.

Private sector mobilization[8] is crucial to the success; The crisis should be used as an opportunity to transform the world to deliver upon Agenda 2030. A multilateral system to respond in a coherent, coordinated, and

comprehensive way is needed to usher in ambitious actions with increased speed[6].

The action is required at three levels-Global, Local and People Action to get the desired transformations. Also, at the global level, we need to take concerted action to overcome the North-South divide that creates a major block to the progress. Linking the circular economy indicators to the SDG indicators, and making them the starting point for policymaking can contribute to achieving significant numbers of SDG targets[9].

The Asia and the Pacific SDG Progress report for 2019[10] highlights that there is a need for fostering inclusion and empowerment, besides the financial support. Some of the systemic barriers to achieving SDGs and recommendations are enlisted in Table 1[11].

As per the Asia and the Pacific SDG Progress report for 2022, though there is some progress on the availability of data, still more than half of the indicators are without data, calling for greater attention to address the gaps (Fig. 1).

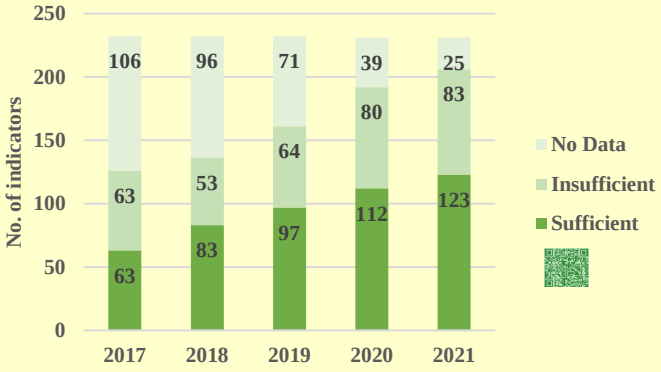

Fig. 1 Progress on SDG outcomes over years

Table 1 Systemic barrier and recommendations to achieve SDGs

Systemic Barriers to achieving SDGs	Recommendations
• Availability and reliability of data • Lack of political will • Weak Capacity • Technical Knowhow • Inadequate mechanisms • Structures to recognize financial opportunities & access available financial resources • Others-Climate Crisis, migration & inequalities	• Enable & empower local governments • Increase institutional capacities • Planning & budgeting & inclusion in national goals • Encouraging decentralized & local participation • Developing need-driven projects • Tackling the challenge of policy coherence by addressing current contradictions between economic, trade and human rights, and investment policies

It is recommended that strengthening of data collection can be achieved through increased cooperation between custodian agencies and national statistical systems, by increasing investments in regular household surveys, and by increased data integration and coordination at the national level. India developed its implementation strategy realizing the importance of synergies and coordination and involvement of

subnational government[12]. The lessons from India can guide others as well. The existing gaps are addressed by increased synergy in the individual efforts of NITI Aayog and the Ministry of Statistics and Programme Implementation (MoSPI) data sourcing, monitoring, and assessment for SDG progress at the center and state levels[13]. It is expected that there would be increased migration from rural to urban areas in the coming years and therefore it is required to have mechanisms to develop rural-urban synergies and empower the local self-governance.

There are specific areas where India needs to work to improve the achievement on SDGs. Most of the policies are set at the national and state level, while the implementation of several targets is to be executed at the city level, this often creates conflicts. For e.g., the city planners' focus is to maximize the network capacities, traffic volume, and speed of travel while the SDGs focus on maximizing accessibility and giving high priority to alternative modes of transportation. Such conflicts can be resolved through sustained efforts in localizing SDGs at the city level[14]. We can revise and design the policies and programs, create institutes for support and enhance the budgets to improve our preparedness for implementation[15].

India needs to work on the following points to strengthen its efforts toward achieving the SDGs:

1. The alignment of the SDGs to the state and district levels.
2. Development of framework at district and local government level for the schemes and programs made by ministries and state government.
3. Devolution of funds, functions, and functionaries to local governments.
4. Capacity building in terms of adequacy of financial and human resources.
5. Domestic resource mobilization.
6. Prompt release in fund flow.
7. Working on the systemic weakness of line departments in rural segments.
8. Preparing development indicators at the block level and improving capacity for data preparation and handling at the level of Gram Panchayat, Block Panchayats, and District Panchayats.

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Sustainable development of coastal and marine areas: a balanced approach for improved livelihoods

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Introduction

India is blessed with approximately 7516 km of coastline- thanks to the peninsular nature of the land and the various islands in the Arabian Sea and Bay of Bengal. Although the Indian coastline is relatively smaller than other countries like Canada, Australia, the USA, Russia, etc., it supports about 330 million people, which is more than the total population of the USA. The coastline is dotted with sandy beaches, marshlands, rocky headlands and cliffs, lagoons, several deltas, mangrove forests, numerous estuaries, etc., and significant geomorphological differences are reported between the west and east coasts (Mukhopadhyay and Karisiddiah, 2014).

Since time immemorial, the population residing close to the coasts has reaped the benefits of its resources (for food, trade, leisure, etc.), but faced calamities (storms, sea-level rise, inundation due to flooding, etc.) as well. However, in the recent century, the frequency and intensity of storms and storm surges have increased globally, resulting in the large-scale destruction of life and property. At the same time, the advent of new technologies (remote sensing, wave rider buoys, moorings, etc.) & forecast methods (large dataset analyses, model-based approach) to identify and track storm events, coupled with the rapid dissemination of forecast and warning to coastal population has played a crucial role in reducing the loss to life and property. Nevertheless, in a rapidly changing global environment largely induced by anthropogenic activities, the Indian coastal population is at high risk of freak storm events as a result of increasing sea surface temperature in the northern Indian Ocean, in addition to coastal erosion due to rising sea levels, frequent flooding of coastal lands due to unusually high precipitation, etc. Therefore, it is very important to identify the major challenges that this ecosystem is going to face in near future and use this knowledge as an opportunity to develop sustainable solutions for the coastal ecosystem (including the human population).

Some Major Challenges

The challenges faced by the coastal ecosystems can be broadly classified into the following categories- 1) Immediate (few years); 2) intermediate (few decades), and 3) long-term (over a century or more).

The immediate challenges are largely caused by increased human activities, mainly resulting in alteration in vegetation, biodiversity, coastline

alterations, changes in siltation patterns, pollution, etc. A sharp increase in human activities (infrastructure development, roadways, damming of rivers, harbour development, tourism activities, etc.) is the main reason for the probable changes in coastal environments. Development of coastal regions like improved waterways and roadways, tourism industry-related activities, land development for better infrastructure and housing, etc., is important for the country's economy and growth. However, rapid and unplanned development may lead to the degradation/alteration of natural coastal morphology, topography, biodiversity, buffer zones, etc., increased risk of pollution, siltation, and degeneration of coastal water quality. With the government aiming to make India a 5 trillion-dollar economy, the pressure on coastal zones is bound to increase both directly (increased footfalls, transportation in the coastal waters, leisure activities, etc.) and indirectly (increased human settlement resulting in disturbing the natural coastal buffer zones, breeding zones of fauna, pollution, etc.).

Intermediate and long-term challenges are largely linked to climate change, increasing sea level, inundation of estuaries by seawater due to low riverine discharge, erosion of coasts, large scale mortality of coastal flora and fauna due to increased temperatures, increased accumulation of pollutants in coastal sediments, creation of dead zones due to eutrophication, etc.

The short-term challenges, although worrisome, can be addressed as follows:

1. Diversifying coastal profession: Generally, the coastal population thrives on fishing and related activities.
2. Alternatives like seaweed farming, oyster culturing, seagrass farming, etc. which have industrial use can reduce the pressure on coastal buffer zones and increase income.
3. Development of artificial reefs to improve local fisheries.
4. Increased use of local resources- both biodegradable and resistant to coastal weather.
5. Enforcing no-activity periods/months- Coastal waters undergo changes both seasonally and annually, affecting the flora and fauna. Some months are crucial for the breeding and development of new crops of fauna and flora. Identifying such periods/months and enforcing zero-activity is essential for the rejuvenation of coastal vegetation and biodiversity.
6. Strict compliance to CRZ rules and ensuring the existence of buffer zones.

For climate change-induced challenges, there are no immediate short-term solutions. Adopting appropriate strategies ahead of the expected impacts of rising sea levels, warming of coastal waters, and associated effects on the coastal ecosystem can mitigate the damages as forecast by model studies. This requires a major policy-driven adoption of climate-friendly practices, reducing energy dependence on non-renewables, and sustainable lifestyle changes.

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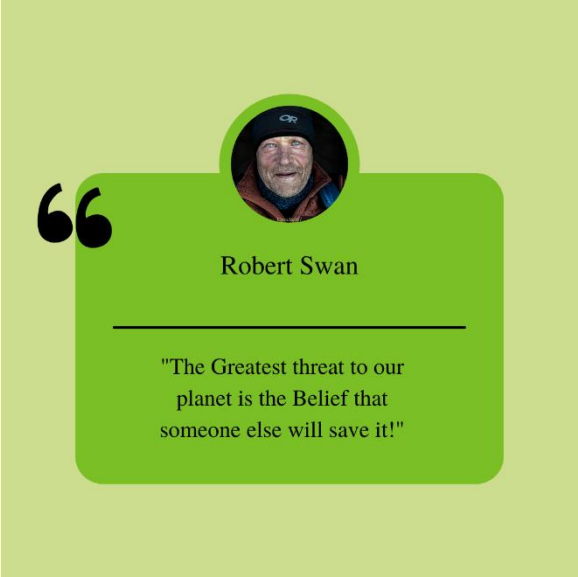

Enforcing Ocean literacy among our communities to accelerate climate mitigation

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National Coordinator Oceans Climate Reality Project
Founder Young Environmentalists Programme Trust

Almost 2.4 billion people live within 100 km of the ocean globally and they interact directly with the ocean regularly (United Nations Ocean Conference, 2017). A significant proportion of all our resources come from the oceans and the sustainability of these sources is intimately linked to decisions made by individuals and society that arise from ocean literacy, defined as an understanding of the interactive and mutual impact of humans, society, and the ocean environment.

> Over 3 billion people depend on marine & coastal biodiversity for their livelihood.

What is Ocean Literacy?

The Marine Biological Association of the United Kingdom describes an ocean-literate individual as one who "Understands the importance of the ocean to humankind, can communicate about the ocean in a meaningful way, and can make informed and responsible decisions regarding the ocean and its resources."

UNESCO defines ocean literacy as "the understanding of our influence on the ocean and the ocean's influence on us. Ocean literacy is a way not only to increase the awareness of the community about the marine ecosystems, but it is as an approach to encourage all citizens and stakeholders to have a more responsible and informed approach toward the ocean and its resources. It is not just knowledge about the conditions of the ocean but an intense understanding of our individual and collective responsibilities to take care of the ocean."

Why Ocean Literacy enforcement among students and the community is vital?

The ocean has captured more than a quarter of human-generated CO2. Yet very little is known about the ocean and its significance to the student community. Research shows that ocean literacy is mostly confined to scientific researchers, postgraduates, and corporates in ocean studies, therefore Ocean Literacy needs to be understood with more clarity and more interactive education with stories, outdoors education, and modules.

> Ocean Acidification continues to threaten marine environments & Ecosystem services. A 100-150% rise in ocean acidity is projected by 2100, affecting half of all marine life.

What 'Young Environmentalists Programme aims to achieve through interactive Ocean Literacy?

The Ocean literacy modules are aimed to educate all age groups on the ocean's resources and how best we can manage them, climate change effects, and mitigation along with our roles towards achieving net-zero.

The program is enforcing the involvement of ocean and environment literacy through

government and community in academic institutions.

Ocean literacy plays a very fundamental role in encouraging and communicating to the common man, everyday citizens, how to practice a sustainable lifestyle beneficial to themselves, their community, the ocean, and the climate of our planet. Our mission goes beyond a scientific point of view and thus it is crucial to involve all knowledge, philosophies, and practices. Ocean Literacy helps to connect and uplift people of various backgrounds, ages, and cultures to enforce positive change and to show them that the Sustainable Development Goals (SDGs) for the ocean are workable and realistic if we work together.

The vision of the **Ocean Literacy mission** of the '**Young Environmentalists Programme**' is to create and share the inclusive ocean narrative including science, indigenous knowledge, and TDK traditional practices that are needed for all the societies to participate in, and benefit from, the UN Ocean Decade.

There are careers in Marine biology, Law, Oceanography, and Geology, besides the numerous other options that our young adults need to be informed about and encouraged to adopt a career choice. Young Environmentalists Program has created a work program outline for the SDG 2030 goals as per the call out for the fulfillment of the UN Ocean Decade.

How does SDG 14 align with teaching Ocean Literacy programs?

The United Nations Sustainable Development Goals agenda 2030 provides the vision for holistic changes in human behaviours, and the climate (SDG 13) and ocean issues (SDG 14) are among the 17 goals to consider. All the 17 goals overlap on many levels, and they impact each other **(Fig. 1**).

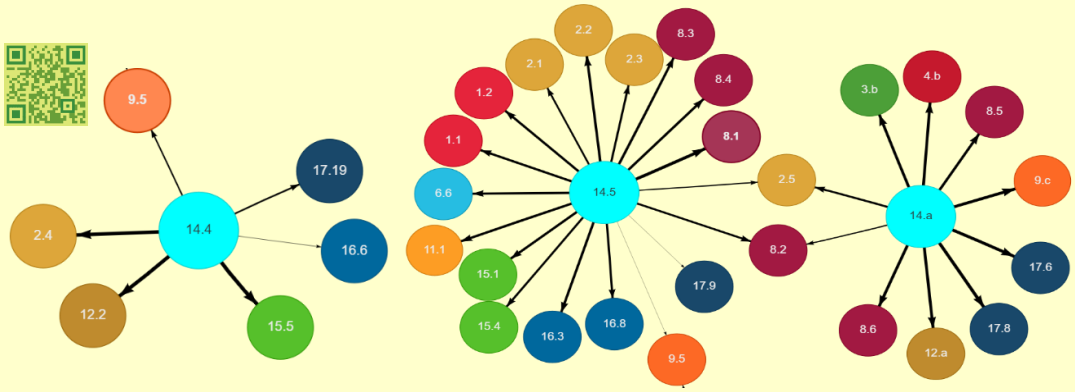

Fig. 1 SDG 14 Interlinkages with other SDGs through SDG Interlinkages Analysis & Visualization Tool (V4.0)

Therefore, to achieve any of the goals, citizens and especially decision-makers need to fully comply with the holistic idea to implement this Ocean literacy movement.

This cannot be done without wide provision of the means for up-to-date education and communication about the importance of sustainable development, which must be directed to all citizens, regardless of their social position and region of the world. The SDG 2030 agenda, IPCC reports, Intergovernmental and global conference outcomes, and international policies need to transcend down right to the common man and not just to the ocean, coastal, and island communities.

It is a very urgent and important task to change people's approach to the ocean and make them aware of the importance of the ocean to all of us now and in the future. The world societies must understand how important the ocean is to our daily lives and how dependent we are on the

ocean, also in relation to climate changes, and hence how important it is to treat the ocean with understanding and care.

An **ocean-literate** person is able to develop and provide evidence-based guidance for adaptation planning, implementation, and evaluation. Such a person can identify and address knowledge gaps, strengthen networks within and across science and policy, practice supporting knowledge sharing, research into use, and learning by doing, and promote capacity strengthening in adaptation among the research, policy, and communities.

The **Young Environmentalists Programme** is focusing on our strengths to deliver on 7 (Fig. 2) out of the 10 targets to create action to conserve and sustainably use the oceans under SDG14 goals.

Young Environmentalists Programme Trust embarks on lakes, rivers, and ocean side modules that shed light on these vital parts of the marine ecosystems' interconnectedness and build support for their protection.
It works on the four pillars of Ocean Cleaning as shown in Fig. 3.

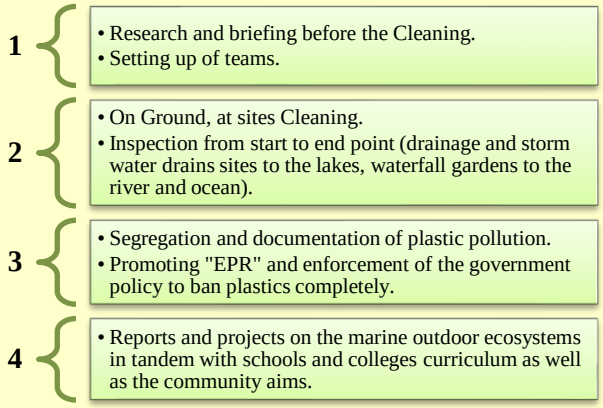

Fig. 3 Young Environmentalists Program-Action

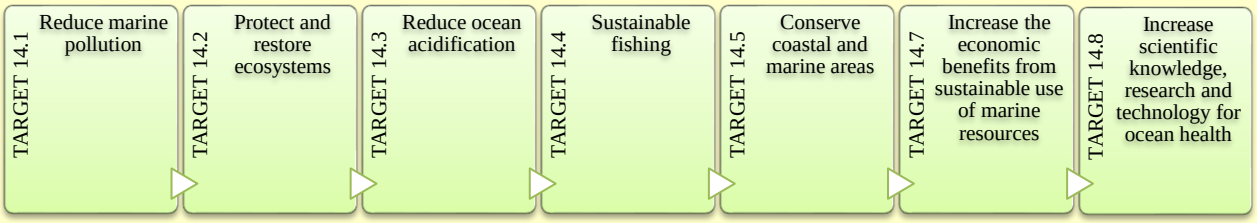

Fig. 2 SDG Targets addressed by Young Environmentalists Program

The goal of ocean literacy initiatives is ultimately to enable behaviour change whereby citizens take direct and sustainable action to achieve sustainable solutions to marine environmental issues, therefore engaging volunteers and community experts to provide the same is also used. The application of social and behavioural change modules created by our experts that provides powerful tools for assessing our ocean literacy initiatives are effective at increasing participants' knowledge and awareness of an issue, its causes, and consequences & behaviors or actions required to enable sustainable solutions.

Why do we need Ocean Literacy and Marine Pollution Education and community engagement?

Marine Ecosystem plastic pollution is a global problem and needs local action, Young Environmentalist program is taking action and engaging the community, Gen Z youth, and students and calls for partners and stakeholders to join the mission.

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Global Goals Critical for Indigenous Peoples at the Frontlines of Climate Change

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The indigenous people of the world face numerous challenges including political and economic marginalization, loss of land and resources, human rights violations, discrimination, and unemployment. They contribute very little to greenhouse emissions and share a unique bond with nature that is now recognized as vital for addressing the interconnected planetary crises, yet it is a fact that climate change has exacerbated the difficulties already faced by these vulnerable communities. Therefore, the Sustainable Development Goals (SDGs) have special relevance for the over 500 million indigenous people.

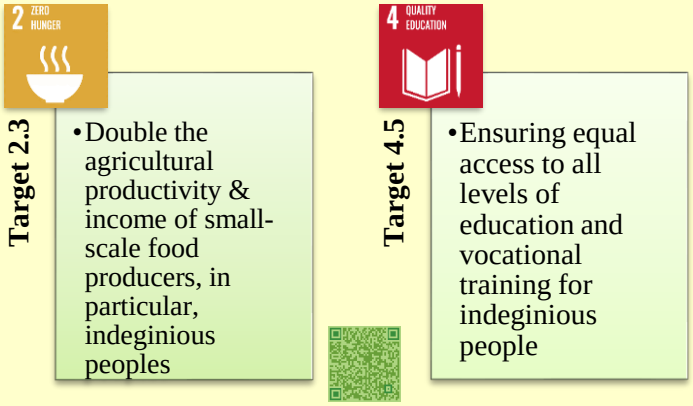
Indigenous peoples around the world are often found at the frontlines of climate change and they are among the first to face the direct impacts of warming and rapid changes in the living environment. Emerging evidence suggests that the livelihoods and cultural identities of the more than 370 million indigenous peoples of North America, Europe, Latin America, Africa, Asia, and the Pacific are already under threat. The utilization of traditional knowledge for conservation of the natural ecosystems has emerged as one of the vital components of resilience development. The UN Declaration on the Rights of Indigenous Peoples establishes their rights to the conservation and protection of the environment of their lands and resources.

The Arctic is the fastest-warming region in the world, with some places experiencing over 5 degrees C rise in temperatures in the past two decades.

In the high arctic region, indigenous communities have survived the extreme cold for tens of thousands of years, depending on hunting walrus, seals, reindeer, and polar bears. Their economic, social and cultural existence and identity are associated with hunting, as well as herding reindeer and fishing.

- There are 5,000 different groups of indigenous people, in 90 countries worldwide.
- Indigenous Peoples are found in every region of the world.
- About 70% of them live in Asia.
- Indigenous Peoples constitute about 5% of the world's population, yet account for about 15% of the world's poor.

The **Sámi**, Europe's only recognized indigenous population, inhabit the northern regions of Norway, Sweden, Finland, and Russia, extending across 388,000 square kilometers. The Sámi people have been herding reindeer in the frozen landscapes since the last Ice Age. Reindeer herding is vital to the culture, subsistence, and economy of all the inhabitants of these regions, not just the indigenous communities. It will take



SDG 2030 Agenda calls for Empowerment, Engagement & Inclusion of indigenous people

all of the Sami traditions, local knowledge, methods of land and resource management, and local knowledge to adapt to these rapid climatic changes.

The **Inuit** who live in northern Canada, Greenland, Alaska, and Chukotka in Russia are hunters and the changing climate and landscape have forced them to alter hunting and harvesting times. They are worried about the loss of sea ice and the extinction threat to animals like the polar bears, walrus, seals, and marine birds that rely on sea ice as a habitat. The Inuit culture and relationships are uniquely related to the Arctic ecosystem, and what happens to the species directly affects their future.

Other indigenous people of the arctic, namely, the **Aleut** in the Aleutian Islands, Gwich'in in North America, Nenets, Chukchi, and many others in northern Russia face similar existential challenges. It is expected that the opening up of the High Arctic Sea routes and the race to exploit minerals and hydrocarbons of the hitherto inaccessible north will further compromise the survival of the indigenous communities of the region.

Nowhere are the indigenous people more threatened than in the Amazon with the invasion of indigenous land by miners, loggers, and farmers in Brazil. Across the Amazon, extractive industries implemented without the consent of indigenous people are threatening their livelihoods. Deforestation is a major cause of climate change and it is having a profound impact on the indigenous communities of the Amazon basin.

Indigenous communities in Africa, Australia, and the small island nations are facing multiple existential threats. Encroachment, water scarcity, food availability, and disease are aggravated by climate change impacts. Rising sea levels may force the abandonment of some Pacific Island nations and displace hundreds of thousands. Climate change impacts will likely lead to the worst ever humanitarian crisis, with indigenous communities being the worst affected.

Indigenous environmentalist Jadav Payeng, the Forest Man of India

Closer home, in the Himalayan region, the lives of indigenous communities are threatened by the glacial meltdown. In the short term, accelerated melting of glaciers increases the volume of water flow, with floods and erosions downstream. In the long term, water scarcity has been predicted by several studies, as glaciers and snow cover shrink. The short-term and long-term impacts will affect millions of montane and riparian communities across the Himalayan region. India is home to about 700 tribal groups which constitute the second largest tribal population in the world after Africa. Many of these communities are forest or fringe forest dwellers, impoverished, and dependent on natural resources for sustenance. Loss of forest cover, invasive vegetation, and loss of indigenous food sources have emerged as direct threats to the food security of millions. The impact of climate change on native biodiversity used as food and medicine by indigenous communities is not known.

The Hindu Kush Himalaya Assessment: Climate Change, Sustainability, and People put together by the International Centre for Integrated Mountain Development earlier this year stated

that even in the best-case scenario, the Himalayan mountains will lose more than one-third of their ice by the end of the century.

The projections are worst for the Eastern Himalayan region, with a near-total loss of glaciers in the same period. With rising temperatures and precipitation changes, the implications for indigenous communities will be profound and threats from glacial lakes, flash floods, landslides, erosion, and extreme weather events are likely to increase. The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) was adopted by the General Assembly in September 2007. The Declaration is the most comprehensive international instrument on the rights of indigenous peoples and establishes a universal framework of minimum standards for their survival, dignity, and well-being. It elaborates on existing human rights standards and fundamental freedoms as they apply to the specific situation of indigenous peoples of the world.

The first World Conference on Indigenous Peoples held in September 2014 provided an opportunity to share perspectives and best practices on the realization of the rights of indigenous peoples, including pursuing the objectives of the United Nations Declaration on the Rights of Indigenous Peoples.

Indigenous peoples are vital to creating a dynamic adaptation and mitigation pathway. The involvement of local communities in conserving and restoring natural ecosystems is important to enhance resilience. It is widely recognized that traditional knowledge and solutions must be harnessed for appropriate localized responses to help cope with these challenges. There are many examples of the fact that indigenous people interpret and react to the impacts of climate change in creative ways, drawing on traditional knowledge and other technologies to find solutions that may help society at large to cope with impending changes. Planning for the future should include enhancement and support for the adaptive capacity of indigenous people integrated with disaster preparation, land-use planning,

Indicators of relevance to indigenous peoples

environmental conservation and sustainable development strategies. These considerations are critical to achieving the Global Goals within this decade as envisaged.

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Solid Waste Management – Trend, Challenges & Opportunities for Sustainable Development

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The SDGs 2030 Agenda, the New Urban Agenda (NUA), and the Paris Agreement on climate change all address solid waste management. It is increasingly been recognized that these agendas and agreements can not be met without addressing the management of waste. Waste can be interlinked to almost all the SDGs, meeting the challenges can also help create opportunities and benefits (Table. 1).

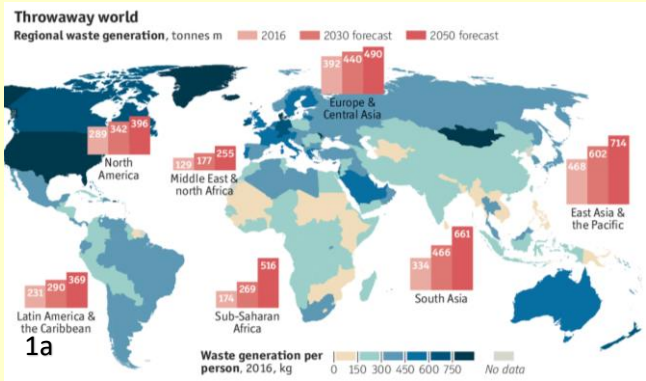
Table 1 Management of waste can help achieving the SDGs and generates opportunities

SDG	Opportunity/ Benefits	SDG	Opportunity/ Benefits
1	Jobs in waste collection & recycling	10	The poorest are harmed the most by poor waste management
2	Reduced food waste, more use of organic waste	11	Better SWM is vital for healthy & resilient communities
3	Less disease caused by open burning & dumping	12	Need to shift from waste to resource management
4	Environmental & health training & awareness	13	Reduced methane & CO2 from dumping & burning
5	Women often most impacted by bad waste management	14	Less plastic pollution in the oceans & sea life
6	Better SWM goes hand in hand with better WASH	15	Less pollution on the land, healthier environments
7	Bioenergy opportunities from organic waste	16	Producer responsibility & governance
8	Waste Management is the world's largest industry	17	Working together, formal & informal, wealthy & poor
9	Recycling innovation is growing & scalable		

Management of waste in an integrated way can directly or indirectly contribute to achieving 17 SDGs.

Waste Trends

Globally, the world generates over 2 billion tons of waste each year out of which over 1/3rd of the waste generated is not processed in an environmentally safe manner. As per the estimated trend, the waste generated is expected to double by 2050 (Fig. 1).



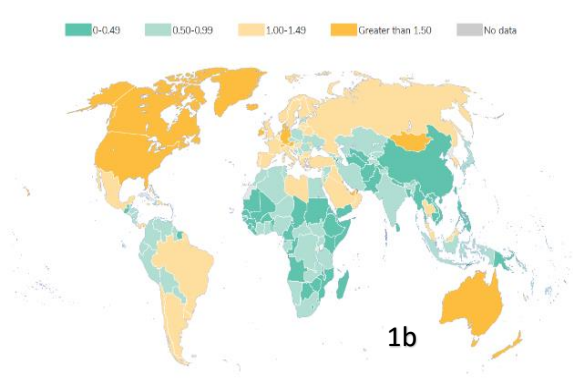


Fig. 1a Source: The Economist Courtesy; Fig. 1b Source: What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050

The per capita generation of waste ranges from 0.74 Kgs. to 4.54 Kgs. With changing lifestyles and more countries becoming developed, this is bound to go up YoY.

Fig. 2 Plastic waste

Waste Management & Climate change

As per the IPCC report, solid waste contributed almost ~5-6% of GHG emissions. However, after taking into consideration all the direct/indirect modes that are linked to solid waste, by some estimates, solid waste can be associated with almost 20% of the GHG emissions.

Out of the total waste generated, while rich countries contribute most of the waste in terms of volume, 90% of the waste in low-income countries is mismanaged while 27% of the population does not even have access to solid waste collection. A lot of this waste gets dumped on the roadsides which then flows into the rivers and eventually into the oceans. **Every year, about 8 million tons of plastic waste escapes into the oceans from coastal nations (Fig. 2)**. Plastics in the ocean are a big challenge as the plastics eventually seep into our food chain which in turn affects the entire ecosystem and health.

Main components of Waste Management

When it comes to waste management, there are five main components of an effective waste management program:

- **Segregation:** Separating waste by material type for further treatment or disposal
- **Collection:** Waste is collected from various sources like residential, commercial, institutional and transported to a more centralized location
- **Transportation:** Moving waste via various modes from collection points for further processing.
- **Treatment:** treating the waste so that it can be processed most efficiently by either reuse, recycling, or treatment without damaging the environment.

- **Disposal:** reuse, upcycling, recycling, composting, landfills, waste-to-energy plants, etc. depending on the type of waste and its calorific value.

While all the five pillars of the waste management program need to work in sync, new technologies provide an impetus in the right direction.

However, based on a survey conducted, listed below are some of the challenges (Fig. 3) that are faced by both the municipal corporations and the waste operators from an operational and tracking perspective:

Fig. 3 Challenges faced by Municipal corporations & Waste operators

Industry 4.0

Waste Management is a key concern for businesses as there is a greater emphasis on reducing pollution, boosting sustainability, and protecting the environment from both the government as well as the public awareness.

In this regard, technologies such as big data, artificial intelligence (AI), automation, and the internet of things (IoT) — all of which form the core of the Industry 4.0 revolution, can play a significant role in revolutionizing waste management.

Any meaningful change starts with the understanding of the problem at hand. Internet of things (IoT) sensors and data analytics algorithms can help waste services to overcome these challenges by providing more information for quicker response. For e.g., IoT sensors (fill level, cameras, etc) in waste bins and trucks can monitor the types of waste different areas generate. Algorithms can then analyze this data to produce insights into recurring patterns, where the contamination is happening, and whether certain areas need to undergo more training. Data can also help to identify the type of solutions that need to be deployed for an area/city. Waste collection and processing centers (also known as transfer stations under the hub & spoke model) can then adjust their operations accordingly to become more efficient.

Albeit some of the solutions are high on CAPEX, it is always good to consider hybrid solutions with QR codes and mobile applications. To start with, it is always good to do micro-level planning at the ward level by collecting the data of the waste generators and mapping out the infrastructure in the city like bins, capacity, transfer stations, etc.

Subsequently, this data along with the ward information can be used to do the route mapping and resource planning for optimizing waste collection services. An example of the data capturing and plotting of the data that helps with better planning is depicted in Fig. 4.

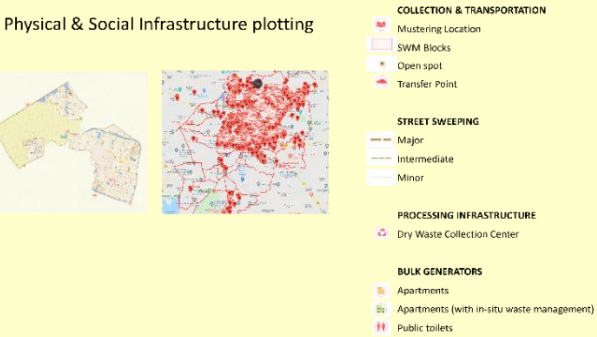


Fig. 4 Data Capturing & Plotting for better planning

EcoSense Enviro, a leading SaaS company provides a smart platform ***AWARE*** for waste management integration built on the Industry 4.0 concepts with a web application and mobile application bringing all stakeholders onto the platform. From our experience, a (non-exhaustive) list of cost considerations and integrations is shared in Fig. 5.

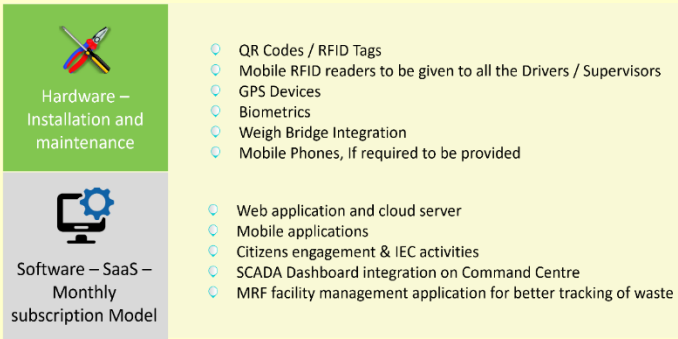


Fig. 5 Cost considerations & integrations

Reference:

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Sustainability is defined by United Nations Brundtland Commission in 1987 as meeting the needs of the present without compromising the ability of future generations to meet their own needs. Climate Change mainly backed by GHG emissions and the Global warming agenda has taken the driver's seat and is the biggest hurdle towards achieving sustainability. The Social and Economic or Governance related issues are the other two drivers which are more localized and the approaches in these sectors are also different. While the development of the country is closely linked to globalization, the support for economic and societal growth often comes at the cost of environmental degradation.

In India, the exports have been increasing steadily but the imports are seeing a much steeper climb. Crude oil and coal imports have been on the rise. 84% of the Indian petroleum demand is met mostly by imports from Gulf, US, Venezuela and Russia. Interestingly, we saw a dip in imports for the first time in 2020-2021 that was mainly attributed to the Pandemic. Gas imports into India also followed the same pattern (Fig. 1).

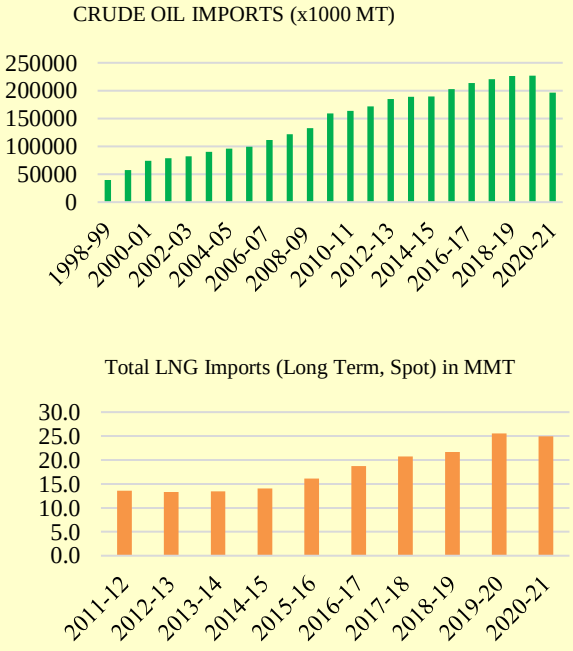


Fig. 1 Crude Oil & Gas imports in India

Global Scenario: The role of fossil fuels in the increased GHG emissions and subsequent Global warming is well proven and a lot of thrust is being put to switch to alternate fuels and electric vehicles. Shipping accounts for 11% of the emissions globally in the transportation industry and has unique challenges in its path toward Decarbonization (Fig. 2). Shipping continues to be the most efficient mode of transportation for moving large volumes of commodities over distances.

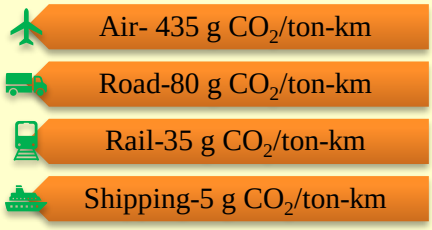


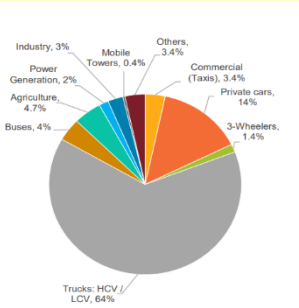
Fig. 2 Emissions by various modes of transportation (Source: Statistica)

The maritime industry is heavily dependent upon the shore-based Research and Developments and Technical innovations in the field of Engines and Fuels, the ships designs are breaking new barriers to reduce the power required for transportation. While International trade and a small percentage of domestic trade are held through the shipping waterways, a large section of the GHG emissions from the land-based transportation sector is from the passenger cars and medium / heavy trucks.

It is understood that increased localization, domestic production, and investments in the area of indigenous technologies /products will reduce imports and result in lesser logistics-related GHG emissions and costs.

Indian Scenario: The Study on the consumption pattern of Diesel fuel in India shows that consumption of diesel is primarily in the Trucks / LCV and HCV segments (Fig.3). The passenger car segment which was mostly dominated by petrol saw an increased 10% sales in 2021. The diesel vehicle sales had dropped from 30% to 17% which is a positive trend. During the same period EV sales in India has also picked up marginally and an increased market penetration of EVs is expected in FY 2022.

Consumer segment	Share Full year
Commercial (taxis)	3.4%
Private cars	14.2%
3-wheelers	1.4%
Trucks: HCV / LCV	64.2%
Buses	4.1%
Sub-total – Transport	**87.3%**
Agriculture	4.7%
Power generation – Gensets	1.6%
Industry	2.6%
Mobile towers	0.4%
Others	3.4%
Sub-total - Non-transport	**12.7%**



https://www.ppac.gov.in/WriteReadData/Reports/202203291206002029009ExecutiveSummarySectoralCo

Fig. 3 Consumption pattern of diesel fuel

Decarbonization can only be achieved if the source of electricity for EV charging is from a renewable source or alternate green fuels. Presently the Indian Power sector is in the transition stage and power production from renewable energy sources is increasing at a slow rate. The primary energy source remains coal in Thermal Power plants, and it is expected to last for the next couple of decades to meet the energy demands of a developing India. The investment in the area of renewable power sources is essential to the success of the EV vehicle as a path toward Decarbonization.

Conclusion: Alternate fuel development is at a nascent stage and not yet technically or commercially feasible for large-scale production. While various segments of the transportation sector are all working toward reducing GHG emissions and subsequently moving towards Net Zero, the challenge is to start the process of decarbonization with the available means. LNG is viewed as a transition fuel for the transportation sector. Thermal power plants still dominate the Indian power sector. The reduction of GHG emissions in the transportation sector can only be achieved through the reduction of carbon footprint by the EV sector and by kick-starting the transportation sector decarbonization, especially the passenger segment.

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Introduction

The Sustainable Development Goals (SDGs) (Fig. 1) were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity. They are broadly framed as a set of 17 goals which include 169 targets. They present a new and coherent way of thinking about diverse issues related to development, such as hunger, gender, and climate change, and are conceived as "integrated and invisible and balance the three dimensions of sustainable development: the economic, social and environmental".[1] Achieving one goal or target may contribute to achieving other goals or targets.

Member States at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2021 agreed to develop the SDGs to carry on the momentum generated by the Millennium Development Goals (MDGs). The MDGs were eight goals that came into existence in 2000 to improve the lives of the world's poorest people. Substantial progress was made regarding the MDGs. The world already realized the first MDG of halving the extreme poverty rate by 2015. In the interest of creating a new, people-centered, and post-2015 agenda, the SDGs are a bold commitment to finish what MDGs started and tackle some of the pressing challenges facing the world today.[2]

Fig. 1 Sustainable Development Goals

Challenges of SDGs

While the SDGs are expected to have an overall positive impact, it is acknowledged that there can be some challenges associated with achieving the SDGs. A few of the challenges are stated below:

1. **Data scarcity**: Monitoring progress towards achieving the SDGs represent an enormous task for countries' statistical systems. Most countries struggle to provide data on SDG indicators. On average, countries had reported one or more data points on only 55% of the SDG indicators for the years 2015-2019. No country reported data on more than 90% of the SDG indicators, while 22 countries reported on less than 25% of the SDG indicators. Countries have improved data reporting on most SDGs in recent years, however, the current pace of progress on SDG data reporting is likely insufficient.[3]
2. **Lack of political will**: Political will can address challenges such as inequality and lack of it can hinder the achievement of the SDGs. Overcoming obstacles requires political will. It requires governments to have the will to make significant institutional changes and demonstrate that such investments will be as low-risk as possible.
3. **Financing SDGs**: One of the major challenges with the SDGs is how to fund them. According to UNCTAD, developing countries need between 3.3 trillion and 4.5 trillion annually, however, currently, there is about a 2.5 trillion gap annually between current funding levels and what is required for financing the SDGs. To resolve these gaps, significant investment and resources are required from both private and public sources.[4]

Opportunities of SDGs

Opportunities aim to boost the necessary efforts and solutions to realize the SDGs. Some of the opportunities are stated below:

1. **Technological improvement**: Technologies have had a significant impact on education, health care, food, and water security among others, which have contributed to people's well-being through improved access and provision of medical care, increasing productivity in agricultural processes, and improving the quality of food and water. Environmentally sound technologies namely renewable energy technologies such as wind and solar energy play an important role in combating climate change.
2. **Revenue generation**: Achieving the SDGs could generate US$12 trillion in business savings and revenue across four sectors by 2030: energy, cities, food and agriculture, and health and well-being.[5]
3. **Environmental protection**: Climate change and environmental degradation can be tackled by bringing together adaptation, mitigation, and development strategies in a coherent way that will support the shift to a low-carbon economy.

India's position in SDGs

India's overall score across SDGs improved by 6 points, from 60 in 2019 to 66 in 2021 making steady progress in areas of health, energy, and infrastructure.[6] While Mizoram, Haryana, and Uttarakhand were the top gainers in 2020–21 in terms of improvement in score from 2019, Kerala achieved the highest overall score in the Index with its efforts to tackle hunger (Goal 2) and provide quality education to students (Goal 4), closely followed by Himachal Pradesh and Tamil Nadu.

Some of the government initiatives taken for implementing SDGs in India are as follows:

1. **Pradhan Mantri Awas Yojana (PMAY):** Flagship mission launched under the "Housing for All" mission in 2015 which intends to provide housing for all in urban areas by the year 2022.
2. **Pradhan Mantri Jan-Dhan Yojana (PMJDY):** Launched in 2014, PMJDY ensures access to financial services such as banking, credit, insurance, and pension to all. This is aligned with the policy of ensuring that 'no one is left behind'.

3. **Beti Bachao, Beti Padhao**: Indian government launched this scheme to address concerns of gender discrimination and women empowerment in the country. This scheme aims to educate citizens against gender bias and improve the efficacy of welfare services for girls.
4. **Smart city mission:** This mission is an urban renewal and retrofitting program to develop smart cities and make them citizen-friendly and sustainable. The mission covers 100 cities distributed among states and union territories.

Conclusion

With one-third of the journey towards achieving the 2030 Agenda already over, the global community is at a critical stage in its pursuit of the Sustainable Development Goals.

Considerable progress has been made on the availability of internationally comparable data on the SDGs. The number of indicators included in the global SDG database increased from 115 in 2016 to around 160 in 2019 and 211 in 2021. However, progress towards the goals is not fast enough for achievement by 2030. The covid-19 pandemic has led to the first rise in extreme poverty in a generation with the global poverty rate projected to be 7% by 2030 missing the target of eradicating poverty. The pandemic has also pushed an additional 83-132 million into chronic hunger in 2020 and has a catastrophic effect on children's learning and wellbeing.[7]

Countries can still deliver on the 2030 Agenda with global solidarity and leadership from the highest political level. Immediate response should include a global vaccination plan to strengthen the financial position of developing countries and embrace a recovery that is guided by the 2030 Agenda. Use the recovery to adopt low-carbon, resilient and inclusive development pathways that will reduce carbon emissions, conserve natural resources, create better jobs, advance gender equality, and tackle growing inequities. Improve availability of internationally comparable data on SDGs to fill gaps related to geographic coverage, timeliness, and the level of disaggregation, to help identify differences across regions and who is being left behind.

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SDG Good Practices-A review

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There has been a tremendous mobilization of various stakeholders globally to achieve the SGDs by 2030.

The United Nations Department of Economic and Social Affairs (UN DESA) has published the SDG good practices that aims to share the knowledge and provide guidance to governments and other stakeholders globally. The compilation consists of around 460 replicable and scalable solutions received from Asia and the Pacific (32%), Europe (18%), Africa (16%), Americas (9%), and Global initiatives (15%).

A snapshot of the best practices from various stakeholders' region wise:

A few of the best practices that have made a remarkable impact are shared to provide a glimpse of the incredible work-

Amongst the **global** initiatives, the Private Sector like Merck has been addressing the SDGs through its investments done thoughtfully in the organizations that are taking diverse elements of the healthcare ecosystem into consideration. Its focus is on the developing world infectious diseases, vaccines, and health supplies to children in these countries as well as in the disaster-prone areas, providing financial inclusion and funding for new hospitals and clinics.

The SDGs addressed through these efforts are SDG 1, SDG 3, and SDG 17. The company is not only gaining the financial returns but is also providing improved access to healthcare for underserved populations through 'Impact Investing'.

The other **global** initiative is by a Non-Governmental Organization (NGO)-Doctors Worldwide (doctorsworldwide.org) which provides a postgraduate fellowship in Refugee and Migrant Health (PGF). The fellowship is a medical capacity-building program for local healthcare workers serving in humanitarian settings for improving clinical practice.

Source: https://doctorsworldwide.org/project/postgraduate-fellowship

It addressed SDG 3 and SDG 4 in regions like Bangladesh which have a high refugee population catering to their healthcare needs.

The **African** region initiative of a government entity-Federal Ministry of Education, Science and Research, Republic of Austria (bmbwf.gv.at) is 'Sprouting Entrepreneurs'. This is a garden-based entrepreneurship education program focusing on the public schools of South Africa.

Source: SDG Good Practices

The program serves the purpose of addressing youth unemployment and food insecurity through education and training covering all the SDGs except SDG 14.

The **Asian** initiative by a Philanthropic organization Rajawali Foundation (rajawalifoundation.org), implemented the SINEGRI project in Indonesia. The project


Source: SDG Good Practices

promoted coordination between multiple stakeholders to support the poor and young vulnerable people and help them in accessing the labor market. The project addressed SDG 4, SDG 5, SDG 8, SDG 10, and SDG 17 and created job opportunities for over 1500 people, and supported more than 100 new entrepreneurs.

The other **Asian** initiative by Vipla Foundation (savethechildrenindia.org)- 'Transforming Exploitation and Saving Through Association (TESTA)' is an NGO that worked to protect women and children from sexual exploitation and to increase the number of convictions in trafficking in Maharashtra, India. The concept of TESTA was based on Collective Impact Model and addresses SDG 5, SDG 8, SDG 16, and SDG 17.


Source: SDG Good

European initiative by the academic institute Durham University, The United Kingdom launched an extra-curricular innovation program 'Game Changer' which was based on 'Design Thinking'. The program aimed to foster innovation, creativity, and ingenuity to achieve the SDGs through environmentally, socially, and economically sustainable solutions. The program enabled students in their career choices & entrepreneurial ventures and addressed SDG 4.

Source: SDG Good Practices

The **American** initiative through multilateral partnership in collaboration with the UN implemented actions through the 'Consolidation of School Feeding Programs in Latin America and the Caribbean' project. It became an important platform providing exchange and cooperation to the school feeding programs. It addressed SDG 1, SDG 2, SDG 4, SDG 8, SDG 12, and SDG 17.

Reference:


Source: SDG Good Practices

https://sdgs.un.org/sdg-good-practices

SDGs India-Performance by Indicator 2020-21

Source: SDG INDIA Index & Dashboard 2020-21

SDGs Snapshot-Global

Source: The Sustainable Development Goals Report 2021: UNSTATS.UN.ORG/SDG/Report/2021

SDG in News Headlines

Draft Programme Released for In-Person HLPF 2022

The draft programme for the annual meeting of the UN High-level Political Forum (HPLF) on Sustainable Development 2022 has been released by the UN Secretariat. The opening of the programme will be dedicated to the meeting on building back better and advancing SDGs with in-depth review on the SDG 4, SDG 5, SDG 14, SDG 15 and SDG 17.

The key focal points of the program would be presentations of 45 countries' VNR and launch of preparations for the 2023 SDG Summit.

April 14, 2022, IISD/ SDG Knowledge Hub

X4Impact Becomes the Member of Flagship Initiative of UN Sustainable Development Solution Network

The market intelligence platform for social innovation X4Impact, is selected as a Member of the SDG Academy Community of Practice. X4Impact is the flagship education initiative of the UN Sustainable Development Solutions Network (SDSN) that provides best available material, research and insights to its members.

April 16, 2022, ET Bureau

Huawei Receives Sustainable Development Best Practice Award from UNGC Network China

Huawei has run several projects as a part of its 'Tech for a Better Planet Campaign' and supported protection of environment along with contribution to fight against climate change and sustainable development. The company has been recognized for its efforts towards achieving the UNSDG and has been awarded Best Practice Award for 2021 from UNGC Network China.

The company has made significant efforts for promoting circular economy, it has not only worked on developing product designs that are made from environment friendly materials but it has also reduced consumption of raw materials and improved resource efficiency.

Huawei has reduced its carbon emissions in 2021 through various initiatives and use of technologies thereby also helping its customers and partners in implementing low carbon strategies.

Apr 07, 2022, https://www.huawei.com/en/news/

Forthcoming Event

Earth Day on 22nd April 2022


Photo by-Elena Mozhvilo

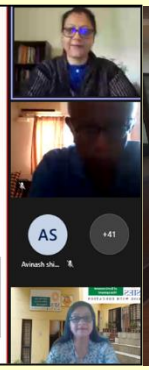
Articles, photos, etc. are invited for the next issue (April-June, 2022) of the Newsletter on the theme "Only One Earth".

Events Organized

The launch of Mission 6 R for Plastic Waste Management on 14th January 2022 was conducted to identify Mission 6 R Champions from different SIES institutions to initiate activities for the complete phase-out of single-use plastic from SIES campuses and reduction of the use of other plastics as much as we can do. The 6 Rs identified for this purpose are – refuse, reduce, reuse, repurpose, recycle and rejuvenate. To further train the trainers, the students of SIES IIEM conducted training programs for the Mission 6 R Champions, faculty and student coordinators of the eco-club, and NSS on 3rd March 2022 in it more than 180 participants were present.

The housekeeping staff, guards, canteen, and temple staff were trained separately on the objectives of Mission 6 R on 16th March 2022.

Masterclass for Upskilling and Reskilling in 2022 on the topic 'Mind Mapping' on 15th January 2022 was conducted by Dr. Ketna Matkar, Mentor for Change, NITI Aayog, and MD, Cipher LLP. More than 45 participants were registered for the event.



Prakkathan: An Ecofest on Environment and Sustainability was organized by the students of the institute on the theme Mission 6 R. In a two-day event debate, poster, and business pitch were conducted.

Prof. Purushottam Khanna Memorial Talk was conducted on 15th March 2022. It was delivered by Sri. Lokendra Thakkar, State Coordinator, State Knowledge Management Centre on Climate Change, EPCO, Department of Environment, GoMP on the topic, 'Reconceptualizing climate actions in view of growing risks and vulnerabilities- experiences from Madhya Pradesh'. The main focus of the talk was on impacts due to climate change, policies, climate action by adaptation, and mitigation.

Invited lectures delivered as a resource person

1. The lectures of 10 hours were conducted by Dr. Seema Mishra on the topics 'Literature Survey, abstracting and referencing' on 3rd and 4th March 2022 in a Ph. D. course work organized by the University of Mumbai's Ratnagiri Subcentre on the topic 'Research Methodology and Publication Ethics' from 21st February 2022 to 8th March 2022.

Invited Lecture Delivered

A lecture by Dr. Seema Mishra was delivered on the topic 'Heat Island Effect: Role of Industries and Government' on 25th March 2022 for Greenko, a Hyderabad-based company in environmental management.

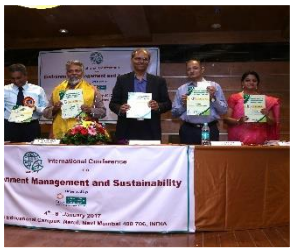
Glimpses

SIES IIEM Faculties

ICEMS 2017

ICEMS 2017

Waterman of India



Souvenier Launch

Funding Agencies for consultancy & R & D Projects

- DST, GoI
- DAE, GoI
- Women Scientist Fellowship Scheme-B, DST, GoI
- MMR-EIS
- Ashoka Trust for Research in Ecology & the environment, sponsored by Sir Jamshed Ji Tata Trust
- DBT, GoI
- ICMR, GoI
- MPCB
- BPCL
- Agrisearch India Pvt. Ltd., Nashik (M.S)
- Raietbandhu Aharodhyam Pvt. Ltd., Mangalore, Karnataka
- Ramky's Mumbai Waste Management, Taloja, Raigad (M.S)
- Paarkadel Ballast Technology Pvt. Ltd. (M.S)
- Seawoods, CIDCO, Navi Mumbai (M.S)

SIES IIEM Partners

Government

- Department of Science and Technology
- Board of Reserch in Nuclear Sciences
- Department of Biotechnology
- MOEFCC, CSIR, DRDO
- Maharashtra Pollution Control Board
- MCGM & NMMC

Non-Government

- MMR- Environment Improvement Society
- Ashoka Trust for Research in Ecology and Environment
- Indian Centre for Plastics in Environment
- Balwant Rai Mehta Panchayati Raj Kendra
- SEAL Ashram
- Society for Services to Voluntary o rganizations

Industry

- BPCL
- Kukyo Camlin
- JSW
- RCF
- Mumbai Waste Management Ltd.
- Agrisearch India Pvt. Ltd.
- Diva Envitech Pvt. Ltd.

SIES INDIAN INSTITUTE OF ENVIRONMENT MANAGEMENT

(Recognized Research Centre Under University of Mumbai)

M.Sc. in Sustainable Development and Environment Management (M.Sc. SDEM)

Admission Notification for academic year 2022 – 2022

Sustainability will be the biggest job sector in near future. Professionals with training in sustainable environment management would be required in public/ private sector for environmental planning, environmental status evaluation, environmental legislation with focus on implementation, monitoring and auditing practices.

M. Sc. Sustainable Development and Environment Management (SDEM) is a multidisciplinary job-oriented course which addresses these requirements. It equips individuals to solve problems in these fields at source rather than at the end - of - pipe interventions.

Eligibility: B. Sc. / B.E. degree or equivalent
Duration: Two year- Full Time

COURSE HIGHLIGHTS

- Highly experienced faculty and high faculty/ student ratio
- State of the art well equipped laboratory for practical's
- Industry centered curriculum with emphasis to develop sustainability professionals
- Interdisciplinary approach
- Innovative pedagogy
- Focus on innovation through project activities and industrial training
- Linkages with various stakeholders like industry, NGOs, consultancy and government departments
- Focus on improving individual skills
- Specialized library
- Placement assistance provided

For Details Contact:
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