

SUSTAINABILITY HORIZON

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Centre for Excellence in Sustainable Development, Goa Institute of Management
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*"Ah love! Could thou and I with fate conspire,
To grasp this sorry scheme of things entire,
Would not we shatter it to bits and then,
Remould it nearer to the heart's deepest desire?"*

– Edward Fitzgerald
(The Rubaiyat of Omar Khayyam)

EDITORIAL

With the graduation of time, the world is moving from one wave of COVID-19 to another. While the expectations of recovery are rising, environmental degradation is gradually coming down. Coincidentally, the Fourth Industrial Revolution has also set in, and the spread of COVID-19 has given a push towards the implementation of digitization activities. As a result, even amidst the pandemic, we are experiencing a sectoral transformation towards being digitized economy. The development and deployment of technological innovations are gradually improving the environmental quality. In pursuit of these innovations, discovery of alternate energy solutions is showing a hope to address the persisting issue of energy security.

With this contextual backdrop, it gives me heartfelt pride to present to you the third edition of the quarterly newsletter "Sustainability Horizon" of the Centre for Sustainable Development at Goa Institute of Management. This edition of "Sustainability Horizon" has brought forth the aspects of the renewable energy challenges, sustainable financing, and bringing resilience to communities. The renewable energy challenges faced by India and the way forward - these two aspects can lead to a possible policy realignment for ascertaining sustainable development. Yet, at the implementable level, several issues persist, and those issues might open possible dimensions for academic research. One of those issues is the mobilization of finances, and the central bank digital currencies (CBDCs) can emerge as a viable financialization option for the private players in the renewable project financing segment. At the end, designing of a robust policy framework requires the involvement of citizens. Hence, in order to maintain the intergenerational equity, development of community resilience is necessary. The perception of the citizens and the expectations of the policymakers need to be aligned in order to obtain the maximum potential benefit of a policy regime. In keeping with these aspects of sustainable development in mind, this edition of the newsletter specifically discusses these issues on various contexts. By bringing the industrial and academic expertise on the same platform, "Sustainability Horizon" aims at presenting a wholesome perspective on sustainability.

We hope that through this newsletter, we are able to contribute to the transition to a new normal which is environmentally sustainable.



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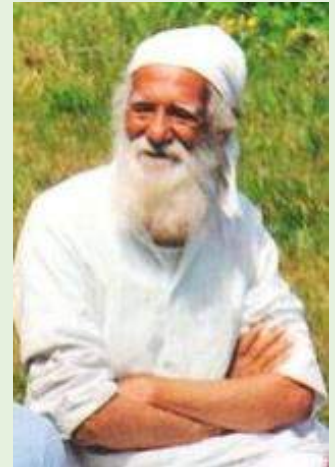
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KNOWLEDGE CENTRE

Our tribute to Shri Sunderlal Bahuguna (1927-2021) who succumbed to COVID-19 on 21st May 2021.

Sunderlal Bahuguna, born in 1927 near Tehri, Uttarakhand was an ardent environmentalist, best known for leading the "Chipko" or tree hugging movement to protect trees in the Himalayas. His vision enabled him to see the relation between cutting of trees and drying up of springs in the Himalayas in the very early days. A follower of the Gandhian principles, he practiced what he preached by leading a simple lifestyle.

In 1992, he led the movement against the Tehri Dam which was anticipated to have devastating consequences on the ecosystem. He also led a 4800 km padayatra (journey on foot) from Kashmir to Kohima to spread the message and seek attention to the ecological importance of the Himalayas. His powerful quote "Ecology is permanent economy" proves to be quite an insight for all of us.



In Shri Bahuguna's words, "The solution of present-day problems lie in the re-establishment of a harmonious relationship between man and nature. To keep this relationship permanent we will have to digest the definition of real development: development is synonymous with culture. When we sublimate nature in a way that we achieve peace, happiness, prosperity and, ultimately, fulfilment along with satisfying our basic needs, we march towards culture."

We hope that we draw inspiration from Shri Bahuguna's work and try to protect the environment in whatever way possible.

TRENDS IN SUSTAINABILITY RESEARCH

With the rise in the population, energy demand is on the rise. The existing energy infrastructures are turning out to be inadequate to fulfill this surplus demand. As a result, energy demand is remaining unserved. This unserved energy demand, coupled with other socio-economic factors are leading towards the growing problem of energy poverty. Though this issue is not new in the policy fora, it is getting highlighted again in the wake of the Agenda 2030. The academic researchers are looking into both the demand and supply side of this scenario. The study by Koomson and Danquah [1] has looked into the impact of financial inclusion on the energy poverty. This study has discussed how microfinance and similar initiatives can be the potential policy instruments to alleviate energy poverty. However, in order to avoid the mistargeting issue associated with financial inclusion, the inlying ethnic diversity of the people suffering from energy poverty needs to be analyzed, and the study by Churchill and Smyth [2] has looked into that aspect. It might also be possible that the poverty might not be at the surface level, but at the latent level. The study by Betto et al. [3] has looked into the "Hidden Energy Poverty", which might open new dimensions of measuring energy poverty. Looking at the supply side aspect of the scenario, Zhao et al. [4] has analyzed the environmental impact of energy poverty. Yet, a major policy void still remains in discovering the possible vicious circle of energy poverty. From the perspective of energy security, this might be a potential research dimension in the area of energy sustainability.

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Globally, every year 5th June is celebrated as the **World Environment Day** to raise awareness about environmental issues. The day was conceptualized by the United Nations way back in 1974. A theme is chosen for every year, and various stakeholders like governments, businesses, influencers and citizens are called upon to participate in the celebrations with a focus on the theme. The focus for the year 2021 is "**Ecosystem Restoration**" with the tagline "**Reimagine. Recreate. Restore**". "Ecosystem Restoration" means preventing, stopping and reversing the damage of various natural ecosystems.

Let us all acknowledge the fact that the environment is not an external entity that we can afford to ignore, but rather the soul of every moment we enjoy on this Planet Earth. Let us all make a difference through our collaborative efforts.

CIRCULAR ECONOMY AND WASTE MANAGEMENT ACTIONS DURING THE COVID-19 PANDEMIC

The COVID-19 pandemic has raised many questions for which there are partial or almost no permanent solutions. COVID-19 has caused enormous amounts of hazardous wastes, which require special attention. On the other hand, Circular economy has been gaining global acceptability. Yet, this concept is not yet strong in the developing countries. This article is aimed at assessing circular economy and waste management actions during the COVID-19.

Manufacturing sector majorly uses traditional linear economy for disposal of waste in India. Hospital and medical wastes belong to a specific waste category, and need special attention. Management of these wastes minimizes harmful effects on the human health and environment through proper techniques of handling, storage, transportation, treatment, and disposal [1]. Health and medical waste for over last 10 to 20 years has been categorized as one of the major reasons behind deterioration of both human and the environmental health.

Gupta (2006) observed that medical waste has not been properly handled, while the staffs are also not trained well. The methodology to be adopted has been recommended by WHO, and the process has five steps: (1) segregation, (2) collection, (3) transport, (4) storage and (5) final disposal of waste in compliance with the standard procedures.



COVID-19 has further highlighted the importance of scientific disposal of medical waste. The accompaniment of Solid Waste Management (SWM) by a public health emergency, such as the COVID-19 pandemic further highlights the importance of these services to the authorities [2]. Given the spread of COVID-19, a special methodology is required to handle these types of waste. This methodology is natural, local, self-sustainable and possess little to no dangerous effects on lives [5].

COVID-19 has raised these questions to next level as hospitals, healthcare facilities and individuals have been producing more waste than usual, including masks, gloves, and other protective equipment against the virus [3]. When these wastes are not managed safely, infected medical wastes can be subject to uncontrolled dumping, which in turn increases public health risks, while open burning or uncontrolled incineration can lead to the release of various toxins [4]. While SWM is an important sanitary barrier to disease prevention, uncollected solid waste in cities is a major cause of disease transmission.

One solution to this problem is "CIRCULAR ECONOMY". India needs a Waste Management Legislation to kick-start the operation of a structured circular economy. The plan must enforce the policy with 5R's hierarchy for SWM (Reduce, Repair, Reuse, Recycle, and Recover). The policy will encompass the protection of environmental standards, enforcement of regulations and legislation, compliance with international treaties, and standards. Therefore, India must move into circular economy by normalizing its principles and practices into Panchayats, Municipal councils, state- and Central government to assure sustainable transition from a linear to a circular economy.

Conclusions:

1. There is a need to formulate a national level road map for use of Circular economy.
2. From Village panchayats to the National Government, a drive for Circular economy must be implemented.
3. Detailed training must be imparted to the low- and mid-level officials on the 5R framework and implementation philosophy.
4. 5R strategy must be the integral part for all the citizens of India.
5. Constant feedback, review and modification needs to made, by the formation of a special task force.

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CBDC GROWTH DURING COVID-19 AND ITS IMPACT ON ENVIRONMENTAL SUSTAINABILITY

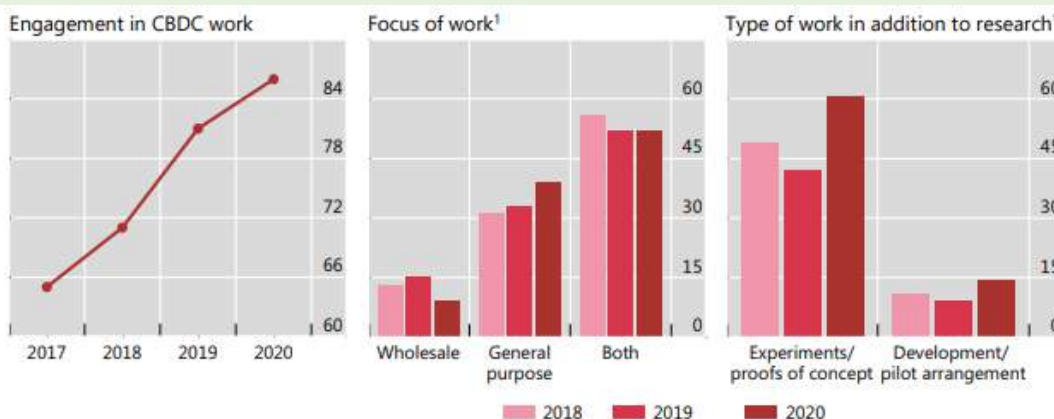


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Globally, we are at a cusp of a major financial transformation. Over the last decade, digital currencies and payment systems like cryptocurrencies, stable coins and central bank digital currencies (CBDCs) have become important innovations with the potential of disrupting existing international and financial monetary systems. The pace at which these innovations are being adopted has increased multi-fold during the current pandemic.

Taking the example of CBDCs further, CBDCs are central bank-issued digital currencies denominated in the national unit of account and is a liability on the books of the central bank (Boar & Wehrli, 2021). Several Central banks felt threatened by the announcement of Libra (renamed to diem), a global cryptocurrency stable coin floated by Facebook in June 2018. This initiated the discussion on CBDCs at offices of many central banks. According to a central bank survey on CBDC conducted by Bank for International Settlements, there has been a substantial increase in the number of central banks working on the development of their own CBDCs (refer to the chart below). The current preference for digital payments due to health risks associated with Covid-19 pandemic has fast paced the efforts of these central banks.



A CBDC does offer improved payment efficiency, safety and robustness and at the same time helps central banks in monetary policy transmission and ensuring financial stability. But in the current scenario we need to evaluate its impact from the point of view of environmental sustainability. While International Energy Agency (IEA) is talking about net zero by 2050 (IEA, 2021), a major step like this, if not accounted for, could negatively impact our efforts.

Majority of the CBDCs are expected to be based on the block-chain technology similar to the existing cryptocurrencies in the market. The most popular cryptocurrency is the bitcoin which accounts for highest market capitalization of all the cryptocurrencies. Bitcoin's energy consumption has received lot of attention by the global media as well as academia. According to a report by Cambridge University (Criddle, 2021), Bitcoin consumes as much energy in a year as Argentina. Energy is needed not only for mining Bitcoins but also for maintaining the block-chain for further transactions. Bitcoin mining requires solving a complex mathematical problem and the complexity is designed to increase every year. So, it would not be fair to assume that the CBDCs will have energy consumptions similar to bitcoin nor is it fair to assume that the current cash payment systems have very low energy consumptions. However, looking at the sheer quantum of CBDCs needed vis-a-vis the total bitcoins mined it is expected that the energy consumption of the payment systems will increase with the introduction of CBDCs. A proper screening needs to be done of the various designs that the central banks are planning for CBDCs from the environmental sustainability point of view. In order to make it more environmentally friendly we will need to increase the pace of our efforts to green our energy sources. This additional energy requirements will need additional renewable sources of energy.



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ENERGY SECURITY, RENEWABLES & INDIA: WHERE LIES THE FUTURE?

The CESD team had the privilege to interact with an Expert* and advisor on renewable energy and energy transition challenges in Asia-Pacific region. He has very rich experience in Business Development activities related to Renewable Energy and Environmental Markets, Sustainability and Strategy in the Asia-Pacific region. He has worked with leading Energy-Utility, Consulting and Chemicals companies in this region. This article includes excerpts from the interaction with the Expert. The views expressed are purely personal in nature and do not necessarily represent the views of any of the organizations he is associated with.

1. Prospects of renewable energy in India & typical challenges faced

Energy transition to achieve zero carbon at scale and speed is a must to achieve global climate objectives. However, any transformation at scales must be profitable. Such economically viable business cases can be achieved either by (A) developing new technology that reduces costs or complexities, (B) reducing costs through economies of scale or efficient supply chains, and (C) changing taxing system to incentivize greener technology or penalize GHG emissions. India is using many of these levers. Government's ambitious plan to achieve 175GW of Renewable Energy by 2022 and further aspiration to achieve 450GW by 2030 are clear examples of use of scale to attract key stakeholders, provide long term outlook and drive down the costs. India is also taking various policy steps for encouraging use of Renewable Energy at consumption. Renewable Energy Purchase Obligation is one such policy that requires bulk consumers of electricity to source certain percentage of their total purchase from renewable energy projects. However, challenges are coexisting with the opportunities in India.



- Poor financial health of distribution companies is the top-most risk that renewable energy companies face. Renewable energy generators, especially the ones that develop large scale projects and also known as Independent Power Producers (IPP), often sell electricity generated from their projects to electricity distribution companies. Most of these distribution companies are owned by state government and are in poor financial health, thus payments to IPPs by such distribution companies against sale of renewable electricity is often delayed. Such delays increase working capital requirement, project risks and cost of capital for the projects.
- The second risk is due to the complex regulatory environment across India. Complexity of Indian electricity sector comes from A) shared governance between Centre and States, and B) electricity tariffs for household and agriculture are determined based on socio-political priorities instead of economic analysis. Thus, the wide variation between legal process and requirements, and distorted market prices add to the complexity.

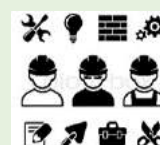
2. Renewable energy solutions for small-scale stakeholders



Under the PM-KUSUM ([Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan](#)) Scheme which is aimed at ensuring energy security for farmers, they can set up grid-connected solar power plants on barren lands and the generated power can be sold to the local distribution company. Solar pumps are also covered under the Scheme. Similar schemes exist for rooftop solar, where the government provides subsidy and distribution companies purchase the generated power. There are empaneled agencies that ease the process by providing a complete design for the requirements and also explain in detail about the investment needed, payback and the subsidy available. For industries or mid-sized companies, roof-top solar PV systems make absolute sense because of the high tariffs of the grid supply. For the industrial sector, if there are financial constraints, most of the rooftop solar developers are now providing the OPEX model wherein consumer gets rooftop solar projects installed without any initial down-payment and all its payment obligations are linked with the monthly energy generated from the projects.

3. Some skill-sets essential for young professionals who wish to take up sustainability related careers

Renewable energy sector definitely has strong growth prospects and so does the demand for talent. However, like most industries, this sector also needs few traditional skills but also sector specific skills. Some of these key skills/roles are:



- The need for Engineering professionals during erection and commissioning continues to exist; but more with a renewable energy flavor like turbine design, etc.
- Interesting opportunities are coming up in the renewable energy sector. E.g.: there is specific requirement of Renewable Energy Resource Analysts who analyze weather data, site conditions and predict energy output from the project using various tools.
- Green, Sustainable and ESC financing are other emerging skill requirements.
- Liberalization of power sector and growth of renewable energy are also creating newer markets and demand for new roles such as: Trading of Electricity, Sales of Power Purchase Agreements / RE Solutions, Revenue/ Portfolio Risk Managers etc.

4. Research areas in the domain where inputs from Research Centers would be useful



One emerging area of importance is the Investors' challenge. In the renewable energy domain, investors make huge investments in an asset with 20-25 years of operational life. Since these projects operate on sun, wind or hydro energy, operating costs are minimal, but have high initial one-time capital cost. Yet, forecasting the revenue over the next 20-25 years for projects with typical payback periods between 10 to 13 years is always

a challenge, as having such a long-term outlook on the market price of electricity or capital cost of future projects is tough. Investor always carries this risk. Although governments are offering long term contracts to purchase electricity at fixed price for 20-25 years, market liberalization and preference of companies for shorter contracts are making the prices more volatile. This larger risk increases the cost of financing, thereby increasing the cost of equity. Researchers can contribute in bringing the balance.

*Disclaimer: Due to Organizational policies, the Expert's identity and organization details are kept anonymous in this article.

POSITIVE CLIMATE CHANGE DUE TO BEHAVIOURAL SHIFT IN MOBILITY- MOMENTARY OR SATIATING SDG

With the spread of pandemic, communities are becoming more independent and resilient. The pandemic fast-forwarded the environmentally friendly mobility measures, while public mobility and car-free cities have become issues of policy debate. Because of lockdown, there is decrease in air pollution by 60% globally and an increase in usage of bikes by 129%. The principle of "Shift-Avoid-Improve" focuses on the creation of "car free" generation by 2025. For SDG11 to be achieved, monitoring the mobility of the citizens is important. In the report issued by McKinsey and Company [1], 52% of the respondents now travel less; the shared micro mobility has increased by 12%, compared to the pre-pandemic scenario.

Cycling has become an alternative transport, which allows easy social distancing and reduces air pollution. Yet, many residents perceive that public transport poses risk to be infected, especially in a country like India, having poor sanitization and thus prefer using private vehicles. Majority of the countries, including India, lost the track in trying to lower the GHG emission targets. However, this pandemic has initiated a sharp decrease of GHGs and improved air quality. However, the positive impact can be momentary if the CO2 levels keep on rising.

A study conducted by WHO has inferred that 80% of the urban population are exposed to harmful levels of pollution. Further, an increase in particulate matter of PM2.5 may lead to an increment in death rate of COVID19 affected patients by 10- 16% due to cardiovascular and respiratory complications. Thus,

- Government must take steps to avoid rise in the emissions after the ease in travel norms.
- Shift from BAU which is likely to increase the temperature by 3 °C to "work from home"
- Implement hybrid model of working, which is a correct balance between WFH and WFO

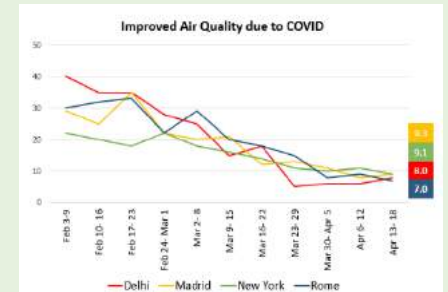
Hence, together with focusing on managing the pandemic, it is also necessary to take into consideration "building back better" by following "green" fiscal approach and a transition to greener sustainable systems.

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IS COVID-19 A BOON TO THE ENVIRONMENT? OR A DANGEROUS CROSSWAY TO NEW REALITY?

In 2016 India signed the Paris agreement pledging towards a future of renewable energy and smaller carbon footprint. Fast forwards to 2020 amidst the pandemic the Indian Government began the auctioning of mines under the 1st Tranche under the MMDR Act 1957, 38 coal [1] Mines were being auctioned and recently in the 2nd Tranche 67 coal mines [2] were offered for auction.



India imported 247 million tonnes of coal in 2019 costing Rs 1.58 lakh crore [3]. This growth stimulus can have negative environmental impact. For example, the "Save Mollem" campaign in Goa, India, where amidst the lockdown in 2020, 3 majors projects for double-tracking of railways, setting up of electricity transmission lines and expansion of existing highway within protected areas of Bhagwan Mahavir Wildlife Sanctuary and Mollem National Park were approved. The cumulative land to be diverted within the protected areas of the Western Ghats a UNESCO world heritage site is believed to be 163.43ha and cumulative forest lands outside are believed to be 200ha [4] approximating to 60,000+ trees. While the government claims that these are independent projects and not related to mining and transport of minerals, environmentalists and locals believe otherwise. Recently, a Supreme Court-appointed Central Empowered Committee has not found any justification for the double-tracking projects undertaken in Goa and has red-flagged this project [5].

In order to avoid this policy tradeoff, few points might be considered:

- The policymaking should consider the principle of Intergenerational Equity.
- We must invest in technology upgradation to increase the efficiency of mining processes.
- Setting up a fund similar to the Norwegian future generation fund to ensure wealth distribution for future generations.
- Reforestation and restoration costs should be accounted for and taken very seriously by both government and private players.

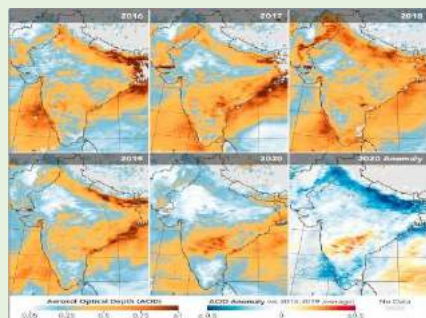
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A TIME TO LEARN FROM MISTAKES AND MOVE FORWARD

The first lockdown in India started on 25th March 2020. The Indian government took unusual actions to stop the widening of the COVID-19. Within a very short stint, environment started improving, e.g., the improvement in air quality, increasing number of Flamingos in Mumbai, Ganga Fit for drinking in Haridwar, visibility of Himalayas from North India. These small changes show the self-correction of the negative environmental externalities exerted by anthropogenic activities.

The Figure shows the AOD (Aerosol Optical Depth) extents of India over the first week of April for over the period of 2016 to 2020. The yellow and blue pixels demonstrating small aggregation of aerosol in 2020, in contrast to dark brown and tan pixels. The image evidently points to the influence of constrained anthropogenic activities during lockdown period of COVID-19. Now, we, humans are at a crossroads: when normalcy will be restored, shall we take lessons from the blunders we have made? Or will the conditions deteriorate further?



As seen after the first wave, in a similar manner – by the culmination of COVID-19, it might be possible that India will face a recessionary pressure and the economic revitalization will be a mandate. However, have we assessed the ecological impact of our actions? Shall we be able to retain the carrying capacity of our planet?

The COVID-19 has unleashed an economic catastrophe. Nevertheless, we have got one more chance to initiate a transformation. A massive and momentous prospect to transform our way of living and restore the ecological balance for the future generations and ourselves.

- **Clever Actions:** Prefer work from home to reduce transport emissions
- **Promote Local:** Use local products, favor promote the local shops
- **Diminish waste:** Appropriately discriminate and salvage, being alert to the utilization of

PPE kits

- **Cut emissions:** encourage the use of public transports, train, bicycles and electric cars and scooters to cut emission

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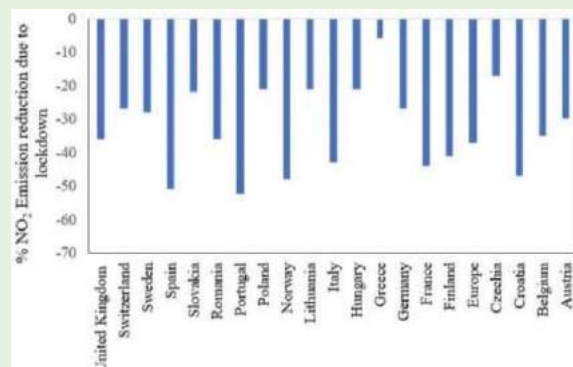


Shruti Srivastava
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COVID-19: IMPROVING ENVIRONMENTAL SUSTAINABILITY OUT OF A CRISIS

COVID-19 after being declared as a pandemic has made a huge impact on people's lives, the world's economy, and nonetheless the environment around us. Carrying capacity of earth has already reduced due to natural resource-driven anthropogenic activities. With the spread of pandemic, boundary of action of the citizens became limited. Being faced with a dilemma to choose between saving lives and economy, governments have to go for the latter. This decision was a boon for the environment since the overall pollution was minimized in the entire period of this crisis. This opens up the door for discussion that can we really transform our polluted environment and move towards a green economy by focusing more on renewable energies.

One of the most significant factors behind climatic shift is Air Pollution around the world, especially in highly populated countries. The major contributors are the Industrial Sector, Road transportation, and the Aviation industry, although this lockdown amidst the COVID-19 pandemic tells us that the overall air pollution has decreased due to reduced mobility across the globe and domestically as well. The graph here shows the reduced level of NO₂ emission in the European countries during the lockdown. This is due to less usage of personal vehicles. A similar impact was observed for water pollutions as well, imposed lockdown has reduced the levels of industrial waste into rivers and water channels, thereby restoring an environment that was 50 years ago. Sustainable development talks about catering to the needs of the present generation without compromising on the needs of upcoming generations.



Following are the steps authorities should take in order to promote an environmental sustainability:

- To promote eco-friendly practices, setup green policies, raise awareness through workshops and PPP channels
- Policies to initiate discriminatory taxation and subsidies for promoting green projects and discouraging non-renewable resources
- Government to incorporate regulators who are responsible for continuous monitoring of pollution and imposing penalties on polluted firms so that firms can move towards adopting renewable sources of energies and eco-friendly ways to function.

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ABOUT THE CENTRE

GIM has always been conscious about the impact of its decisions on the ecosystem around it and has continuously strived to reduce its carbon footprint. Along with measures like rain water harvesting, solar-powered street lamps, treatment of water for reuse, tree plantation drives and many more, the institute has expressed its commitment to this philosophy also through its mission statement which talks about sustainable business and an inclusive society for India and the world. In line with this commitment, the [Centre for Excellence in Sustainable Development](#) was officially formed in July 2018 to contribute to GIM's quest for sustainability. The Centre started working with three core objectives in mind:

1. KNOWLEDGE CREATION

- To develop a model institute for green campus in India and transform GIM community into a more sustainable community. At the same time, use these processes for action research in the field of sustainable development.
- To help develop knowledge through research in the aforesaid field.

2. KNOWLEDGE DISSEMINATION

- To increase awareness about green living and sustainable development in the community around us
- To carry out activities to try to reduce the carbon footprint of the state of Goa and India as a whole.

3. KNOWLEDGE APPLICATION

- To develop a resource Centre for sustainable development at GIM for imparting training, providing consultancy and participating in policy making.
- To contribute to the development of start-ups and ventures for sustainable development at the grassroots level.

Over the next few years, Centre plans to contribute towards the following five sustainable development goals adopted by United Nations member states in 2015:



CESD believes that every graduate of GIM should be a sustainability ambassador and every employee should be a part of GIM's journey towards environmental sustainability.

Some of the current projects and activities of the Centre include:

- A study of the sustainable campus development initiatives of national level institutions in India
- Development of a Biodiversity Register of the GIM Campus
- Development of a Sustainability Report for GIM
- Webinars and trainings about energy conservation, energy policy, sustainable finance, etc.

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GOOD READ

Title of Book: Silent Spring
Author: Rachel Carson
Year of publication: 1962

If you think that a single person cannot protect the environment, you must read "Silent Spring" by Rachel Carson. This courageous woman took a very bold step by documenting the impacts of the indiscriminate use of the pesticide DDT in the United States, giving several live examples. The title of the book stood for a spring where no birds sang – thus indicating a bleak future. In the book, the author called for all human beings to ensure that they acted responsibly, with a deep sense of respect towards mother earth. The book marked the beginning of an environmental movement that eventually led to a ban on the use of DDT in the US.

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