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Challenges toward sustainability and role of Pandemic to Trigger it: A mini-review

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ABSTRACT

The UN has announced 17 goals (sustainable development goals [SDGs]) to be met by 2030. It is estimated that one of every ten people on the planet now lives in areas that come under Decrees of Climate and/or Environmental emergency. Also, linear management resources/materials is another issue where we could not reach circular economy and SDG12. It is in this same world in 2020 (on a global scale, COVID-19 started multiplying in 2020 though it was first identified in Wuhan, China in 2019) that a microscopic virus unleashed biological havoc and initiated a healthcare crisis, one from which the world has not yet come out of. It has disastrously impacted human life from all angles- livelihoods, survival, socialization, and economics. Both environmental imbalances, as well as the pandemic, are associated with the same roots of origin, human violation of nature. The article is based on the challenges of sustainability and the impact of COVID 19 to trigger it.

Key words : *Sustainability, Environmental emergency, COVID 19, Impact*

Introduction

According to the UN, sustainable development is "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*." It is the reasonable usage of the available resources keeping the long-term needs and effects in consideration. The UN has announced 17 goals (sustainable development goals [SDGs]) to be met by 2030. It is estimated that one of every ten people on the planet now lives in areas that come under Decrees of Climate and/or Environmental emergency. "Earth provides enough to satisfy every man's needs, but not every man's greed" was quoted by Mahatma Gandhi long back. Our natural resources (forest, soil, water, fuel, etc.) are continuously depleting and pollution is continuously increasing.

The lineàr material management is à tràditional model based on "take-make-consume and wàste" approach for using resources. Here, the raw-material is transferred in to product and after the end of its usage, it is thrown in to landfill. This is also known as an open cycle since it resembles a flat line. This approache should not be conused with maximizing the use of ràw material befîre it gets disposed off. For instance, wastage glass and paper are both utilized to make new glass and paper via Circular material management. If the material is nonbiodegrable, it can go for reusing, repurposing, and recycling it. It entails the importance of the segregation of dry waste and wet waste at source. The wet (biodegradable) waste can go for composting or biogasifying it. It also cuts down on substances that would otherwise end up in landfills and consequently reduces pollution (Kamaruddin *et al*., 2021; Velumani and Manikandan, 2020; Azizpour *et al.* 2020; Suanu *et al.,* 2018; Zhang *et al.,* 2014).

Sustainability is sought in increasing the eco- effectiveness of the system. This means that not only the environmental impact is minimized, but also economic value persists. But maximum developing countries are not able to follow the circular economy model in their waste management system due to infrastructure, awareness and collection system, etc. Due to unsegregated mixed waste production, the waste matter cannot be recovered and reused properly.

The same world in 2020 (*on a global scale, COVID-19 started multiplying in 2020 though it was first identified in Wuhan, China in 2019*) that a microscopic virus unleashed biological havoc and initiated a healthcare crisis, one from which the world has not yet come out of. It has disastrously impacted human life from all angles- livelihoods, survival, socialization, and economics. Both environmental imbalances, as well as the pandemic, are associated with the same roots of origin, human violation of nature. The climate breakdown, environmental hazards as well as epidemics have all been triggered by unrelenting urbanization in the name of globalization, mining, slash-and-burn agriculture, reduction of natural habitats, and exhausting natural resources. The intensified carbon release while sucking the global carbon sink dry has stoked up global surface temperatures, which has taken a huge toll on the resilience, health, and immunity of the natural world (news link: times of India, who; BBC; 2020). More than 75% of the new diseases detected in the last 3 decades are ones with Zoonotic origins- meaning they originated as a result of the spread of bacteria, viruses, or other parasitical organisms from wild/domestic animals, to Homo sapiens. Also, drug, metal resistance microbes are continuously generating due to high-level pollution of drugs in sewage, ocean, etc (Ghosh *et al.,* 2013; 2016; 2019; Panchal *et al.,* 2020; Ilame and Ghosh, 2021). SARS, MERS, Ebola, and the latest COVID-19 (SARS-Cov-2) have been described by experts as an honest natural response to humanity's uncontrolled exploitation of nature. This is also a testament to the global neoliberal developmental model being fallacious, enabling catastrophes of global proportions in the name of spurring economic growth (Hakovirta and Denuwara, 2020). India is the second most populated country (place of the one-sixth world population) all over the world.

For ages, women have been facing problems and discrimination in society. People do not consider a girl worthy and a person with capabilities. Also, Women are the main stakeholders to consume natural resources, waste generation, farming, nutrition, awareness, and empowerment. Without adequate gender equality in a developing country, we cannot achieve sustainability as well. and it plays a major role to achieve the sustainability targets of the whole globe.

Major Challenges to Sustainable Development

Major challenge is the financial insecurity of the developing country. Due to lack of funds, the infrastructure is poor and advanced technology cannot be used. This is a reason for environmental issues and social problems. Also, inefficient governance, political instability, lack of inter-and intra-nation cooperation, lack of awareness among the general public are important social issues.

Economists typically quantify economic growth in terms of gross domestic product (GDP) or related metrics derived from the GDP calculation. Growth has ranged between zero and five percent per year in previous decades, according to the GDP and growth measurements presented above. Growth rates surpassing 5% (as assessed here) would appear to be unsustainable based on long-term trends. Sustainable development many times requires the investment of capital for the technology and policies which are needed to be implemented. If a country lacks the proper financial resources, it would not be able to invest in sustainable development. The government of mostly developing nations would more tend to invest the resources into the activities which may bring instant results and would less likely to invest in sustainable development technologies which may take longer to show their effect on the environment and hence it creates a hindrance to the application of sustainable development models in many developing nations. In many developing nations, the financial, as well as physical resources, are many times exploited by the bureaucrats, and the whole sum of capital and resources are often not applied to the model, this makes the sustainable development model less effective. Sustainable development is a practice that is needed to be ensured by everyone in the society and it is not just an act of government and authorities. But in most developing nations, people are not aware and do not have the proper knowledge and right attitude towards sustainable development. This creates a hindrance since a good model might even also fail if people do not

follow the appropriate behavior towards it and continue to do the activities that might deteriorate the environment.

Natural occurrences such as earthquakes, tsunamis, and floods can create a hindrance in the pathway to sustainable development. Because, firstly, it is a great loss to the infrastructure and most of the investment is needed to be done to rectify the ill effect of these natural occurrences, secondly, if it is drastic, it may also be harmful to the human lives and hence it may decrease the human resources available to a country. The engines used in automotive vehicles exhaust many harmful gases like CO and SO_2. They also use Tetra Ethyl Lead (TEL) as an anti-knock agent in petrol for smooth and easy running of vehicles. Carbon monoxide (CO) is a colorless, odorless gas emitted from the incomplete combustion of carbon-based fuels including petrol, and diesel. The use of automotive cannot be completely banned and also switching to green technology like the electric car has its limitations overcharging and lack of infrastructure. Automotive contribute a large amount to air pollution, although norms and policies have been devised it remains one of the challenges to sustainable development. Many developing nations, and some developed nations too, still rely on excessive use of non-renewable energy like coal, petroleum, natural gas as their main source of energy. These energy resources are limited in number and take millions of years to replenish and also causes pollution. It creates ahindrance to sustainable development as it is not completely possible to completely ban these resources.

Positive effects of COVID 19 on Environment

The Pandemic has had both positive as well as negative impacts on the environment as a whole given its spreading capacity and how the whole world is in contagion. The rivers and extremely dirty and polluted water bodies around the globe (especially in developing nations) became dirt and pollutants free for a few months (Castka *et al.* 2020; Gautam and Hens, 2020). The ambient air quality even in the most polluted cities of the world became much cleaner. Wildlife and human interactions decreased dramatically due to which they flourished. With fishing activities reduced, marine life regained the lost livestock. Industries were shut down due to which the greenhouse gases emissions were reduced. Haze and smog that was quite common in most of the cities across the globe reduced or even disappeared. With the travel restrictions, the travel and conveyance-related pollution from cars, buses, airplanes, and railwayswas reduced. This led to much cleaner air and less carbon footprint. The coal fuel usage in the factories was reduced which helped in the conservation of fossil fuels and also reduced the combustion relation pollution. Reduced stress on tourist destinations, which helped the reduction of pollution on those destinations. Reduced noise pollution due to a shutdown of industries, reduced gathering, reduced construction work, fewer vehicles, etc. Table 1 shows the positive and negative effects of COVID 19 on the Environment.

The COVID-19 pandemic drastically led to the constriction of human mobility and thus enabled a lesser penetration of human activity into wild and natural spaces.

Due to lockdown in many countries, there were fewer automobiles and vehicles on the roads, flights were not operating and the industries were closed as well. Due to this, it has been observed that the air quality in many cities has been improved and air pollutions have decreased. According to reports, a drop of 20-25% in Carbon dioxide and 35-40% in Nitrogen Oxide was observed. Innovative appliances that reduce the human need to be physically present in settingshave set a new norm thereby setting the tone for a sustainable future where physical infrastructure is replaced by digital infrastructure,

Table 1. Positive and negative effects of COVID 19 on Environment

S.No.	Positive effects	Negative effects
1.	Reduced Air Pollution	Increasing Non-Recyclable wastes
2.	Water quality improved	Increasing Organic Waste:
3.	Flourishing of wildlife	Difficulty in waste management:
4.	Decrease in OIL Demand	Testing of vaccines on animal
5.	Boosting Natural Vegetation	
6.	Declined Fishing on Marine Life:	
7.	Reduction of Carbon footprint:	

thus reducing civil engineering projects and building of skyscrapers and urbanization as a whole. It also saves fuel burning and consecutively reduces air pollution. Technological advancements in the field of healthcare have led to the ideation of universal public healthcare and access to all, thus equalizing society and the environment (Lokhandwala and Gautam, 2020; Mahato *et al.,* 2020; Maione *et al.* 2016; Manisalidis *et al.,* 2020; Masum and Pal; 2020).

The industries were closed in the lockdown, as a result, the water consumption of the industrial sector has decreased up to 30-35% than earlier and also, during the whole duration the harmful chemicals and industry wastage were not disposed into the water bodies and hence the quality of water bodies has been increased than earlier. The hotels were closed as well, the water consumption has been decreased at a mass level. The intergovernmental Panel on Climate Change (IPCC) has predicted that a 1.5-degree Celsius rise in atmospheric temperature may put up to 30% of species on the scale of extinction. Due to lockdown, there have been observed that many species which were not often seen otherwise were coming out of their habitat. There have been cases where wild species have been observed on the streets, this shows us that it has been a rejuvenating effect for these species. Since the local travels, as well as international travels, were banned, as a result, there was less demand for oil/gasoline all over the world during the lockdown. This has further resulted in less air pollution as well since harmful gases and byproducts released when these fuels are burned. Oil pollution also has adverse effects on water bodies, animals, and insects. It disrupts the food chain and makes water incompatible with irrigation. Due to the fresher water available and decrease in air pollution, and a reduced amount of human interference, plants and vegetation are exposed to better quality air and water and hence their productivity has been observed to be increased resulted in better vegetation. During the lockdown, due to restrictions in movements, the supply chain of the fishing industry got disturbed and as a result, there was a reduced sale, but it has made a positive impact on marine species. According to reports, there has been observed a drop of 10-15% in fishing activities globally as compared to the year 2018-2019. Across the world, 2019 saw a huge uproar in terms of emergency declarations that were married to climate change concerns. More than 1750 areas of jurisdiction in 30 countries declared emergency states due to unforeseen climate crises as volatility in weather patterns which even led to the extinction of many a species.

The Carbon footprint of individual countries began to decrease as production was now mostly focused on necessary goods only which leveled the non-recyclable effluent releases from various industries. The Pandemic meant a diffuse decrease in private travel as well as luxury goods consumption. This led to the stoppage of activity in mining industries and other exhaustive-exploitative industries, led to natural reforestation, and increased air and water quality across the globe. Figure 1 shows the Positive effects of COVID 19 on the Environment.

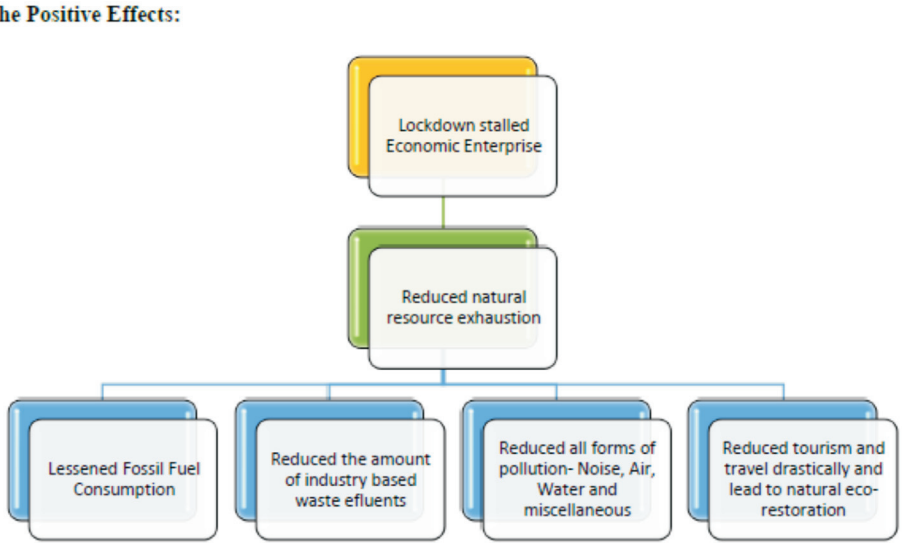

Fig. 1. Positive effects of COVID 19 on Environment

Negative effects of COVID-19 on the Environment

Lockdowns and quarantines across the world have increased dependency on technology by a great amount. This means the foundation to laying more obtrusive digital infrastructure which directly means an increase in radiation levels from electronic devices. This affects various species of flora and fauna as it tarnishes their natural habitats. Substantial increase in biomedical waste production like needles, bandages, masks, gloves, syringes, discarded medicines, etc. Increased waste disposal problems due to large amounts of waste. Increased plastic waste generation due to Personal Protective Equipment kits, face shields, etc. The dramatic increase in municipal waste due to lockdowns and has a direct effect on air, water, and soil quality at the place where it is dumped. Improper waste disposal due to which there is an increased threat of transmission of these viruses to other species. Improper disposal has also led to the mixing up of pathogens into the river water, groundwater, seas, and oceans, which itself is a bigger threat to mankind. Increased use of sanitizers has led to the wearing away of the top layer of skin and has started affecting the nervous system badly. Increased disinfecting activities on roads and public places have led to the killing of non-targeted beneficial species of the environment.

During the lockdown, the home deliveries were increased, there was a surge in online shopping and online food deliveries, as a result, more and more plastic was sued for the packaging. Production and disposal of surgical masks, gloves, and PPE kits, face shields became another concern for the environment, all the plastic waste which was generated was disposed to the landfills, which increases soil pollution. It is also harmful to the air and water bodies, as these plastics are not completely breakdown by the microbes, and hence, they get clogged into water bodies. Due to a disturbing supply chain and decline in cargo shipments, the organic inventories containing, for example, wheat and rice, didn't get shipped on time, and hence it got rotten in the inventories only. This has increased organic waste, globally.

During the lockdown, due to the reduced number of waste management workers and another connected workforce, it became extremely difficult to dispose of the waste properly. In many countries, it was even required to set up separate medical waste plants, only to dispose of masks, PPE kits, and other surgical equipment which may be contaminated at a separate place. But, the countries, which couldn't afford to have such facilities were greatly impacted by these wastes. Municipal level accumulation of organic and inorganic wastes leads to the localized spread of infection across animals. The stray animals are left hungry and destitute due to the closing up of hotels and other ancillary units whose wastes meant food for the same. Increased usage of plastics and

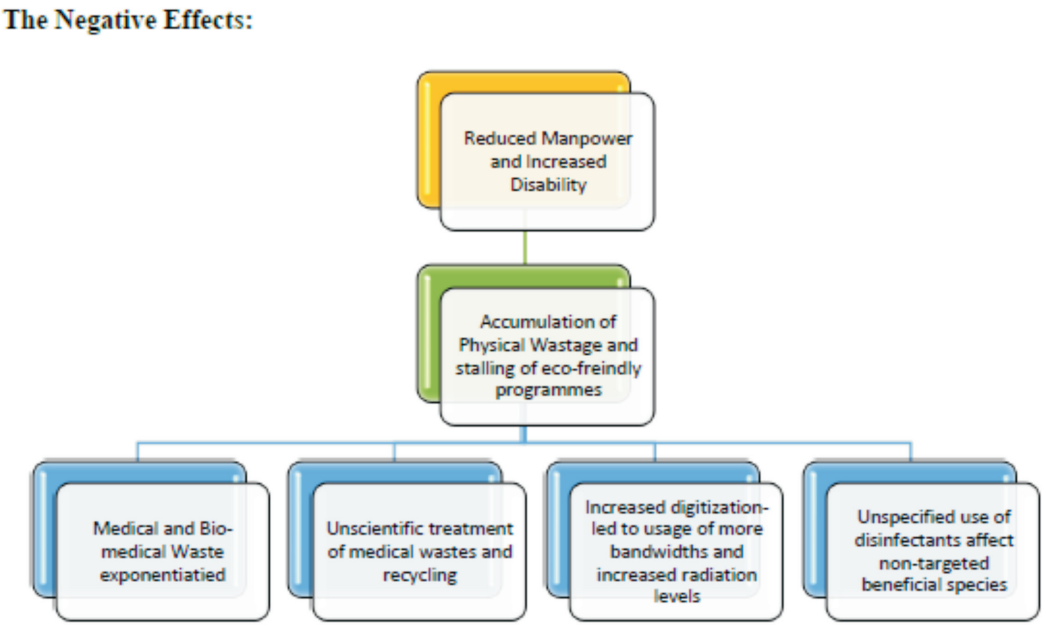

Fig. 2. Negative effects of COVID 19 on Environment

other non-biodegradable entities for making PPE kits, masks, and other goods relevant to survival in the new normal.

Increased testing of vaccines on animals and other species due to the unavailability of a universally acceptable and resilient vaccine to date. This can lead to unprecedented ramifications wherein the virus can transform into more deadly variants if the vaccine is not fruitful. Figure 2 shows the negative effects of COVID 19 on the Environment.

Conclusion

For the restoration process of the tourist spots ecologically, these spots should be kept closed for a few weeks or months for their restoration. The promotion of ecotourism will mitigate the ill effects of tourism on tourist spots and willensure a healthy environment. A proper disposal chain should be introduced which would systematically dispose of the waste and would prevent it from getting mixed up with water in the water bodies. Proper handling of biomedical waste. This would eliminate the chances of pathogens of COVID-19 jumping into the other species. Social distancing protocols should be followed as they would reduce the usage of sanitizers and disinfectants and will help prevent problems in the human body. International cooperation will be quite helpful in this scenario in formulating the stepsand measures to get rid of this deadly virus.

Haloculture uses tremendously saline water and soil resources for the economic andsustainable production of crops (Figure 3). Focus on the Universal use of Organic and biodegradable Products. More adherence to social-distancing norms and innovation in biologically viable disinfectant alternatives that are non-threatening to other species. Improve and make supply chain robust: Proper supply chain management is required in the conditions where restrictions have been imposed for a longer duration of time on travels. To ensure the smooth flow of materials and resources, it is required that a proper supply chain management plan is devised by the government and authorities so that proper waste management is ensured. Also, there should be enough strategies and advanced technologies to adapt circular material management and 5Rs (refuse, reduce, reuse, repurpose, and then recycle) principle everywhere to reduce waste. By that waste to wealth can be made. Also, waste burning is very common which subsequently produces toxic air pollutants and causes different lung diseases. To achieve the goal of the Glasgow Summit we need to stop the waste burning and need to switch to renewable energy to combat climate change.

The Negative effects at large of the pandemic are short-term given the possibility of an end to the spread of the virus in the future. This means strategy and policy aiming at conserving global life whilst tackling the short-term negative effects are the need

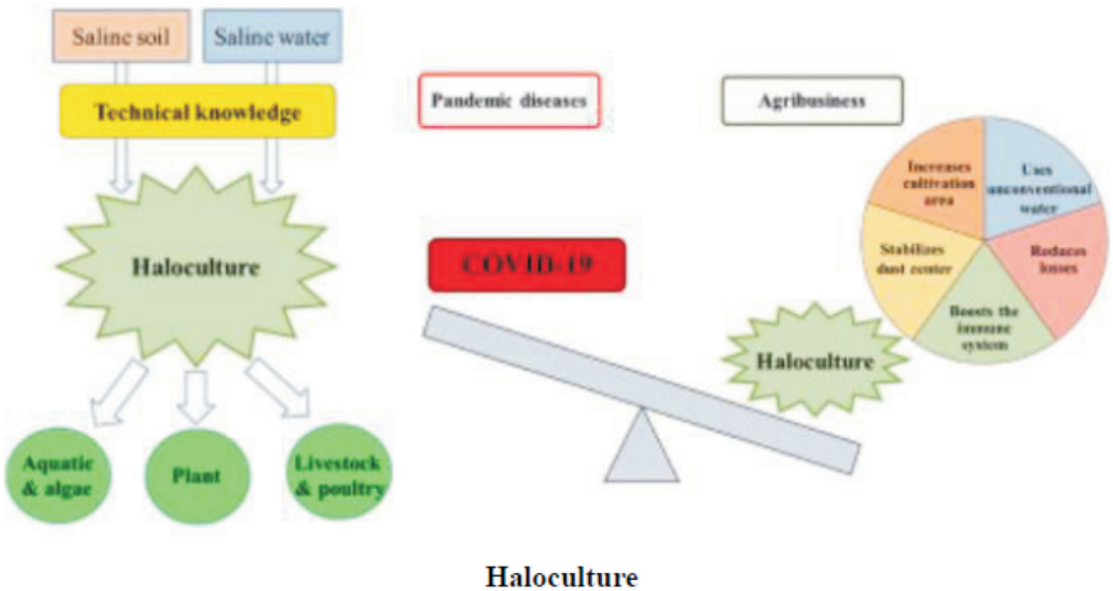

Fig. 3. A brief flowchart of Haloculture

of the hour. All the universe including land, water is polluted with drugs, metals, dyes, and many more pollutants. There is an urgent necessity to stop the drug usage in minimal sickness and thereby it will reduce the drug resistance microbes to be generated (URL Link: WHO). The COVID pandemic has proposed hybrid modes of learning as well as service which renders many of the already existing physical infrastructures obsolete. This would lead to an increased liability on the environment which would lead to corrosion of natural spaces.

The recommendations are as follows-

a) Ecological Restoration: The Pandemic has initiated a mode of phase-wise lockdown of ecologically vulnerable zones for economic and tourism activity. This can be extrapolated in a COVID-free world also, where ecotourism can be modulated more sustainably.

b) Behavioral Transition: The basic exploitative nature of human behavior has to undergo drastic changes and awareness has to be spread about how interlinked our acts are in changing the environmental balances.

c) Industry 4.0 with a Green Focus: The new industrialization practices with overt importance on automation and digitization have to be compliant with eco-friendly practices and ensure that the environmental focus is not lost in the race for technological and economic advancements.

d) Reduced use of plastic packaging: Since during lockdowns, home deliveries were increased, there must have been another substitute to plastic packaging like the use of paper bags, and cloth bags for packaging, so that less and less amount of plastic is used and hence better for the environment.

e) Use of Medical and protective equipment made of eco-friendly materials: There have been researches that support the making of masks, gloves, and PPE kits from green synthetic materials, which reduces the use of plastic. Ecofriendly masks and protective materials are available in the market. There has been an emphasis on more use of cloth material as a substitute for plastic.

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