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ENVIRONMENTAL EFFECTS OF COVID-19 IN INDIA

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ABSTRACT

The Corona Virus Disease 2019 (COVID-19) is an acute virus creating respiratory disease and gastro intestine disease in humans. The outbreak of novel corona virus (COVID-19) has brought serious impact on all counties around the world. Spread of COVID-19 was controlled by countries through restricted movement, self-hygiene practices and social distancing. Despite all the efforts made by the governments, this pandemic brought serious effect on economy and environment. The impacts of COVID-19 on air, water and waste management were assessed and were observed that air and water quality has improved due to lockdown but the management of waste is a serious issue. This article describes the results of study performed on the environmental effects particularly in air and water by assessing the environmental conditions before and after the outbreak of pandemic COVID-19. Waste segregation and separate treatment of waste streams play important roles in reducing the environmental, health, and social impacts of waste and waste management. Various changes made to waste collection and management because of the COVID-19 pandemic affected waste segregation and recycling. Since the start of the pandemic, various sectors, including the food, waste management, and healthcare sectors, relied on the increased use of single-use plastics to prevent transmission of COVID-19. This study improves the hope that, implementation of proposed guidelines will improve the purity level of environment and management of biomedical wastes effectively.

KEYWORDS : *COVID-19, Environmental analysis, Pollution assessment, Waste management, Municipal solid waste*

INTRODUCTION

The corona virus (COVID – 19) as a pandemic has brought a serious impact on environmental health and economy. Municipalities provide waste management services to their residents to meet one of their basic/essential needs– safe and timely collections of waste. These vital services are often interrupted by disease outbreaks, as seen with the novel coronavirus (COVID-19), which can result in the improper storage and disposal of waste. Waste generated from self-quarantine houses, hospitals and self-hygiene practices followed by people has posed an enormous effect on waste management sector. Disposal of infectious waste along with municipal solid waste has created threat to people handling the waste and the environment. Based on the environmental analysis performed on air, water and waste management, solid guidelines has been provided in treating the waste management effectively. This article recommends the need for improving the waste treatment methodology and the significances of policy framework to face pandemic situation in future Although numerous initiatives are underway to phase-out single-use plastics to mitigate environmental pollution from waste plastics,

demand for some single-use plastic products has surged due to the COVID-19 outbreak. The increased use of PPE has created an enormous demand for single-use plastic products, including face masks, face shields, gloves, head mobs, gowns, and shoe covers, all of which require safe disposal, thus creating problems for downstream waste management. In addition, various levels of government have mandated the use of face masks in public places and businesses to reduce the spread of COVID-19.

Polypropylene melt-blown nonwoven fabric is the primary filter material used in a medical mask. However, masks are also produced from polystyrene, polyethylene, polycarbonate, and polyester. The increasing production and consumption of single-use plastic products during the COVID-19 pandemic could have long-lasting adverse impacts on the environment and global goals to reduce reliance on single-use materials and circular economy initiative. Various efforts and management strategies are being implemented to manage the surging waste during this pandemic; however, technological advances in MSW and SMW management, their environmental, economical, and societal impacts are yet to be synthesized. This study compiles waste management initiatives that are being implemented during the COVID-19 pandemic to discuss their advancementand their environmental, economical, and societal impacts.

MATERIAL & METHODS:-

Various academic search engines (Science Direct, Google Scholar, SpringerLink, Mendeley, Scopus platforms, Worldwide science, etc.), as well as online information (Google, news articles, reports, Web sites) were used to assemble literature related to MSW and SMW management in prepandemicand pandemic periods. MSW, SMW, COVID-19 waste, healthcare waste, waste management technologies, contaminated waste management, life cycle assessment, environmental impacts, and economic and societal impacts were used as keywords. The were collected and grouped according to their categories (introductory, environmental, economic, societal).

RESULTS & DISCUSSION:-

Worldwide spread of COVID-19 in a quite short time has brought a dramatic decrease in industrial activities, road traffic and tourism. Restricted human interaction with nature during this crisis time has appeared as a blessing for nature and environment. Reports from all over the world are indicating that after the outbreak of COVID-19, environmental conditions including air quality and water quality in rivers are improving and wildlife is blooming. India has always been a hub of pollution with huge population, heavy traffics and polluting industries leading to high air quality index (AQI) values in all major cities. But after declaration of lockdown due to COVID-19, quality of air has started to improve and all other environmental parameters such as water quality in rivers have started giving a positive sign towards restoring.

EFFECT ON AIR:

Air pollution has attributed to more than 7 million deaths across the world and around 1.4 million in India. It has been reduced considerably due to the lockdown. Restriction on travel resulted in non-movement of aircrafts and vehicles throughout the world. This resulted in decreasein harmful emissions in the atmosphere (Polk 2019; Verisk2020). NASA satellite pictures showed a decline in the levels of nitrogen oxide by 70% because of reduction in the utilization of non-renewable energy sources during the lockdown (UCAR 2020). Carbon monoxide and aerosol concentration were also reduced (Gautam and Trivedi 2020; Holthaus 2020). Based on the observation by the contaminant levels in the air was seen reduced in Delhi during lockdown. Rather than other contaminants, PM10 and PM2.5 was found to be reduced by around 50 % [Machado and Samina, 2020].

EFFECT ON WATER:

Lockdown has brought a reset for nature and human population. Articles from various dailies and magazines reported that there is an improvement in the quality of streams like Ganga, Cauvery,

Yamuna and so on (Lokhandwala and Gautam 2020; Pathak and Mishra 2020). This improvement was seen due to the closure of industries which let their untreated effluent into the rivers. River quality parameters such as DO and BOD were considerably reduced (Pathak and Mishra 2020). CPCB inspected the quality of various rivers in India during March and April. The river water quality was assessed on parameters pH, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD) and Fecal Coliform (FC). The results were compared with the Primary Water Quality Criteria for Outdoor Bathing notified under Environment (Protection) Rules, 1986. As per their report submitted to National Green Tribunal (NGT) on September 16, 2020, water quality of major rivers in India was not improved significantly. As the lockdown was relaxed from June, the water quality parameters were seen to be increased due to human activities (Lokhandwala and Gautam 2020; Pathak and Mishra 2020).

EFFECT ON WASTE GENERATION:

Though COVID-19 has brought a considerable change in air and water quality, it posed a serious effect on waste management. Increase in the quantity of waste generation was due to the isolation and stay at home practices. Not only the municipal solid waste but also the amount of biomedical waste was increased due to hygiene practices followed to prevent the spread of COVID-19. As the developing nations do not have proper waste disposal and management facilities it resulted in the improper disposal of biomedical waste. Thus proper disposal of waste with appropriate care is needed to prevent the spread of corona virus through disposed waste (Ferronato and Torretta 2019; ISWA 2020).

Inadequate maintenance and carelessness in safety measures has brought the need of the hour to safeguard biomedical waste. Proper functioning of waste management needs continuous function of workers and safety measures to be followed by them during collection to avoid spread of corona virus during collection and disposal. Appropriate handling of biomedical waste from health care facilities and households should be followed by public and health care workers. represents the necessary practices to be followed during pandemic situations (ISWA 2020).

Figure 1: Solid waste management practices

EFFECT ON IMPROPER DISPOSAL OF BIO MEDICAL WASTE:

During pandemic situations like COVID-19, the amount of biomedical waste generated will be high. It is due to the disposal of contaminated masks and PPE in large quantities. Improper use and disposal of masks and gloves has resulted in risk of human and aquatic life. It was also seen that face masks were disposed without proper care along the streets thus resulting in pressure on waste management system (Emily 2020). Biomedical waste management system needs proper collection, storage, transportation and disposal with proper safety measures and training (UNEP 2020). Till now, India has only limited facilities to handle and dispose the biomedical waste. It has been reported that there are only 198 common bio-medical waste treatment facilities (CBMWTFs) and 225 captive incinerators are operational in the country. Due to the sudden outbreak of COVID-19 and unexpected

rise in the quantity of biomedical waste generation has brought a serious issue in handling and disposing them (Datta et al. 2018; UNEP 2020).

Fig. 2.-Improper disposal of face masks (Source: Independent News)

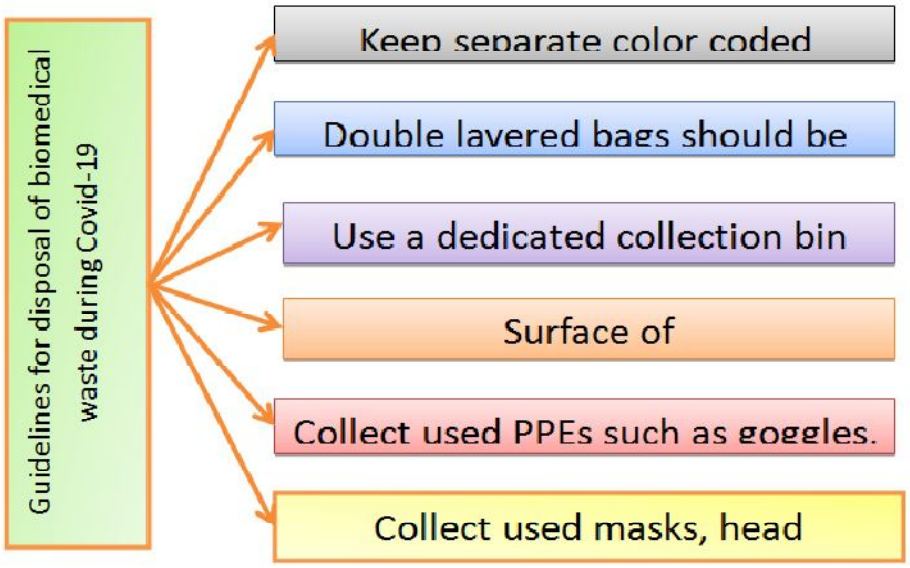

Fig. 3.-Guidelines for disposal of Biomedical waste by CPCB

COVID-19 OUTBREAK AND MSW MANAGEMENT-

The COVID-19 pandemic has led to unprecedented challenges in handling MSW, including the influx of SMW and single-use plastic PPE in waste streams. Contact with contaminated surfaces is one common mode of infectious disease transmission and plays a crucial role in spreading infectious diseases. Consequently, usual waste management practices have been augmented due to the pandemic to reduce interaction between site staff and the public, thus reducing the risk of spreading infectious diseases. However, a recent study has argued that fomite plays a small role in COVID-19 transmission, and there has been an overemphasis on cleaning surfaces and disinfecting packages.

Municipal waste management facilities are typically designed to handle a predictable and steady waste flow rate, with some seasonal variations on waste volume. During the COVID-19 pandemic, the volume of medical waste dramatically increased, while increases and decreases in MSW volume has been reported in different regions. For example, during the COVID-19 pandemic. The enforcement of lockdown protocols forbidding in-person dining has led to an increased use of single-use plastics for packaging of takeout food and food delivered to residences. Consequently, healthcare waste is expected

to continue to rise until the pandemic is over or even in the post pandemic period, as the global population adjusts to a new normal.

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PRESENT AND FUTURE OF WASTE MANAGEMENT:

Measures to be taken on treatment and disposal of biomedical waste produced during treatment, determination and isolation of COVID-19 patients was proposed by the Central Pollution Control Board, New Delhi, and Government of India on March 18, 2020. It recommended that that isolation wards should maintain separate coded bins for disposal of waste. Based on their endorsements, workers dealing with disposal of biomedical waste should be given adequate training on handling and sorting them (Ramteke et al. 2020).

Though rules and regulations were proposed on handling and disposal of biomedical waste by the government, it's in the hands of an individual to follow and prevent the spread of COVID-19. Hence to avoid sudden enforcement of rules and regulations, waste management during emergency situations should be made as a part of disaster planning and management. Thus, the health care workers all around the world should be trained to handle the infectious wastes. Also, proper classification of waste based on their type and nature may help in preventing unnecessary waste generation (Ramteke et al. 2020).

Corona virus has not only affected human life but also indirectly affected air, water and land. Lockdown has brought positive impact on air quality as many industries were closed and movement of vehicles were restricted. Concentrations of greenhouse gases were found to be reduced in most of the cities around the world. Illegal disposal of effluent without treatment in rivers was reduced due to lockdown, thus enabling improvement in water quality. Most of the rivers in India are revived back to its best condition. Though COVID-19 has brought positive effects on air and water quality, its short termed and it's the responsibility of citizens to preserve the nature which has revived itself. As to prevent the spread of corona virus people are advised to wear mask, gloves, PPE kits etc. (Ramteke et al. 2020).

CONCLUSION:-

The findings of the present study confirm that COVID19 pandemic has made all the developed and developing countries face severe economic and social instability. Although several measures were taken by them, the spread of COVID-19 is becoming unstoppable. Governments around the world are trying to prevent the spread of virus through lockdown, social distancing and self-hygiene practices. Improper disposal of all those has brought a serious threat to waste management. Health care workers involved in waste management are susceptible to exposure of COVID-19. Biomedical waste quantity has

increased drastically, but the disposal options are very less. Incineration facilities are used to dispose biomedical waste but it may release toxic gases in environment. Hence Government should frame necessary policies to handle pandemic situations and waste management options should be modified to adapt increased waste quantities.

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