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CENTRE FOR ENVIRONMENT  
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# GREEN REPORT

PART ONE



CEDM

# BIOWASTE: ANALYSING USAGE AND CHALLENGES ACROSS SECTORS

About the Author: Avinash Singh is an Assistant Professor at SOA National Institute of Law, SOA University, Bhubaneswar (Orissa)

## Introduction

Biowaste could be defined as the organic waste that has decomposition properties in the condition that may be aerobic or anaerobic. Biowaste could originate from various sources that may start from the kitchen and extend to industrial and commercial processes. It contributes the central part of the total municipal solid waste that originates and is predicted to grow faster than the rate of urbanization in the coming future.

Therefore, this report is a crucial overview of the condition of biowaste and its impact on the environment, which in due course, shall help assess the future pathways for biowaste management at different levels across sectors. The present piece of writing discusses the challenges posed by biowaste followed by the discussion on energy and economic perspective related to it. In furtherance, the present writing outlines some benefits and thus concludes by following a normative approach that balances the risk and benefits of biowaste, eventually achieving environmental sustainability.

## Challenges Posed by Bio-waste

Biowaste has been a challenge for the population in different regions across different sectors. One such challenge of biowaste was recognized in the Ukrainian agricultural sector, where management and utilization of biowaste have become a significant quandary, and lack of funding or awareness has made the problem a troublesome task to tackle for the institutions. Biowaste has presented health challenges, wherein the short-

term exposure to organic dust for young and healthy people has been suggested to cause adverse health effects to stimulate lung-related acute systematic alterations (Carbon Monoxide (CO) is a toxic gas harmful to the environment and human health; therefore, it is essential to measure the CO emission from biowaste to assess and protect the environment and people exposed to such CO during biowaste decomposition.

Understanding the chemical properties of biowaste or organic waste compound shall help to suppress the emission of harmful elements, which during an experiment with biowaste from herbal medicine suggested reduction of a specific compound responsible for the emission of harmful gases when processed through a particular procedure, hence contributing to the protection of the environment and human health (Younghyun Lee et al., Catalytic Pyrolysis as a Technology to Dispose of Herbal Medicine Waste (2020).

Another such challenge has been evidenced in the biowaste management industry wherein a particular type of fungal species, *Aspergillus fumigatus*, proved to be occupational hazard for the workers in the biowaste industry. (Toxicity studies of *Aspergillus fumigatus* administered by inhalation to mice, Toxicity report series, 33 (2021)) Thus, various diseases have the potential of transmission depending upon the quality of biowaste that creates antibiotic resistance. Also in studies, it was found that it also opens doors of a channel of transmission of disease from animal



to human (Ann Albiñ, Recycling Biowaste -- Human and Animal Health Problems (2002). Another debated usage of biowaste produce was seen in the Central Europe wherein the purpose-grown biomass for electricity generation has received higher subsidies (as much as twice) that had negatively influenced the arable land and, in some cases, shortage of agricultural food produce and availability of food products (Jana Kliestikova et al., Subsidies to Increase Remote Pollution). Also, landfilling is the leading system to utilize biowaste, but it also has its demerits as biowaste then engages in the emission of harmful elements that cause environmental concerns (Jana Kliestikova et al., Subsidies to Increase Remote Pollution).

### **Renewable Energy and biowaste**

Biowaste feedstock is a significant source (biogas conversion conduits) of energy with the lowest cost of CO<sub>2</sub> abatement, wherein a mixed system of power and heat is utilized with raw biogas (Martin Lambert, Biogas: A significant contribution to decarbonizing gas markets); the typical example being the electricity generation from biowaste by processing biogas (ROBERT F ICHORD, Transforming the Power Sector in Developing Countries: II (Atlantic Council) (2020)). Apart from electricity generation, biowaste as charcoal (in the form of briquettes) could be utilized for cooking, heating at residential and industrial setups, and forms a sustainable form of energy a sustainable form of energy (Rachel Godfrey Wood & Ben Garside, Informality and market governance in wood and charcoal value chains 2 (International Institute for Environment and Development) (2014)). In addition, a case study in Ukraine has demonstrated that the energy generation for specific sectors could reap a better result, and in said study, the agricultural sector was considered for biogas production appreciation through biowaste for selected tenacities (Borzenko et al. at 79). The potential of the nutshell-based biowaste like peanut, hazelnut, walnut, etc., has promising

properties that could act as alternatives to various energy demanding fields and hence, the residue of the biomass's residue has a vital role in climate neutrality (Tomasz Noszczyk et al., Kinetic Parameters of Nut Shells Pyrolysis).

Germany being one of the innovator states in the global environmental protection regime has insisted on promoting the use of biowaste for biogas production and subsidizing the usage of crops like maize and cereal grain in biogas production (Floris van Foreest, Current status and 2020 perspective for biogas (Oxford Institute for Energy Studies) (2012)). German Research Centre for Geosciences (GFZ), while installing three biogas plants, has induced one plant for biowaste and sludge treatment for electricity production (David Balussou et al., An Economic Analysis of Three Operational Co-digestion Biogas Plants in Germany). This shows the theoretical implementation commitments on the part of the German policy for the use of biowaste towards energy generation, thus affecting environmental sustainability in the due course. Therefore, other studies in place regarding biogas production from different biowaste sources have presented a more significant opportunity in the alternative energy market (Chima C Ngumah et al., Biogas Potential of Organic Waste In Nigeria).

### **Economy of Bio-waste**

Biowaste has been an issue of discussion among the galleries of states trying to reduce their carbon footprints and move towards greener energy sources exiting the fossil fuel-based energy markets. In this reference, the bioeconomy in countries have responded differently, while European markets are developing high-value molecules for a cleaner source of energy, the African shift to utilizing biowaste are observed differently. African markets directly impact the economy for the rising cost of fossil fuels that led to the development of the techniques for biowaste management, mainly for energy production, with a weaker focus on green

energy initiatives like the European Union regions (Rocio Diaz-Chavez, Introduction (Stockholm Environment Institute) (2020).

Recycling of biowaste could also become part of the major economic growth inducement wherein the direct and indirect creation of jobs could ultimately change the dynamics of the region's economy where such initiatives are proactively implemented (Daniella Echeverría et al., Waste Recycling and Reuse 8 (International Institute for Sustainable Development (IISD)) (2020). The European Union's plan to connect the European refugee to collect the European biowaste for converting it into biochar (obtained through thermal decomposition of biomass rich in carbon in the absence of oxygen) could prove economically effective in the mutual interest of EU, Refugees and environment sustainability (Jonas Philip Goldman, A New Deal for Refugees). Composite Network has been a vital stakeholder in biowaste treatment and management plans for the member nations that works comprehensively towards changing the usage pattern of biowaste from landfilling to recycling, thus infusing a significant push to the economy of the EU nations following such biowaste management practices. However, the lack of such coordinated efforts in other parts of the globe keeps the challenges related to biowaste persist and continues at different levels of public and private sector systems.

### **Benefit and Utilization of Bio-waste**

Biowaste has been one of the significant sources of energy, and if harnessed efficiently, could help achieve long-term environmental sustainability goals through the generation of green energy. However, biowaste has been studied for various industrial and commercial purposes that try to outperform in economic and technological aspects. One such example is using biowaste to remove or extract heavy metals from water or wastewater because the chemical properties of

biowaste present such results that could cost cheaper and more environmentally sustainable than existing technologies (Magdalena Madela & Monika Skuza, Towards a Circular Economy: Analysis of the Use of Biowaste as Biosorbent for the Removal of Heavy Metals). Biowaste materials portray properties that act as an alternative to the biomaterials used for making biomedical equipment and applications (Thirumala Vasu Aradhyula et al., Compounding and the mechanical properties of catla fish scales reinforced-polypropylene composite—from biowaste to biomaterial). Also, the researchers have studied the fibres and shell-oriented biowaste to explore the commercial manufacturing of fibres and reinforced polymer matrix that can replace synthetic ones.

Biowaste has been used as an alternative to the soil from borrow land for landfilling of mines as biowaste is rich in organic substances. In the wake of the increase of the basic sanitation facilities, the sewage sludge is seen as an alternative as it is rich in the organic compound that could replace as the cover layer of quarries during environmental restoration. Waste management has been defined as including various processes that include biowaste, and hence, biowaste recycling has been viewed as an integral part of the cycle economy and reduce the waste output contributing to long-term environmental sustainability (Muhammad Tariq Majeed & Tania Luni, Renewable Energy, Circular Economy Indicators and Environmental Quality: A Global Evidence of 131 Countries with Heterogeneous Income Groups.). In addition, there is a need for continuous research on the issues relating to biowaste recycling techniques and to make them more sustainable, reducing the damage to the related equipment for achieving the overall sustainability to the environment.

### **Conclusion**

However, the use of biowaste has more benefits as an organic compound for various reasons. Hence,

even if the presence of a harmful substance in biowaste couldn't be under discussion relating to the presence of agrochemical (Matthias Gassmann et al., PFAS – a new class of emerging agrochemicals), there are still various situations wherein such biowaste compound has contributed to increasing environmental sustainability. Biotechnology has emerging scope to bio-recycle the biowaste with a positive influence on environmental sustainability and has the scope of increasing food production without any pressure on the environment). Therefore, comparing the risks and advantages of biowaste usage shall help derive a normative approach that contributes to environmental sustainability without causing ill effects on human life and the environment. Therefore, policy frameworks related to biowaste or organic waste management could be built upon a system of scientifically and economically backed theories that shall provide environmentally sustainable outcomes.

# THE PLIGHT OF GARHWAL

**About the Author:** Vinayak Uniyal is a 4th Year BA LLB student at Vivekananda Institute of Professional Studies, New Delhi.

The general flora and fauna of a region add value and sustenance to an ecosystem. Compromising with these tears apart the connection between man and nature thread by thread. It endangers the culture and natural heritage of the region.

The mountains of the Garhwal region of Uttarakhand are dying — a simple, yet eye-opening statement that is still lurking in the corners of our national newspapers even though the causes and calamities are fairly obvious. The forest fires of Uttarakhand are like the monsoons of Mumbai, making news every year. The people and culture of Garhwal are directly linked to the forests, and with

its depletion, the Garhwali culture is also on the verge of extinction.

Everything is interlinked in nature. A slight disbalance in one part of the ecological system creates a domino effect, affecting everything within its ambit. The mountains of Garhwal are majorly covered with coniferous pine trees 'pinus' as known as 'cheed', which are infamous for drying the land they stand on. In the summer season, these trees shed their leaves in bulk which catch fire instantly, leading to the burning of many square kilometres of area in the jungle. In the period of 2004 to 2011, 2818 incidents of forest fires were reported to the concerned authorities. Besides causing fires, these pines have no major commercial usage either. The wood of pine trees cannot be used for the manufacture of furniture. Its only use is in making wooden containers which were used during the colonial era for transportation of goods.

Another disadvantage of the pine trees is that they rapidly dry up the soil. Due to this phenomenon, the water level in the mountains has gone down. Water shortage has been causing many problems in the region, as a majority of people in the mountains are engaged in agricultural activities. Without water, agriculture is not feasible and without any source of income left, the youth is forced to work in metropolitans, urban and semi-urban cities.

An RTI filed by Hemant Gunia, a Haldwani based activist reveals that people from 3946 villages have migrated permanently, deserting their ancestral homes. These villages now come within the definition of 'Ghost Villages'. Different sources provide a different quantum to the number of ghost villages, but none of them deny their existence. Since 2011, more than 5 Lakh individuals have migrated out of the state; district Tehri Garhwal has seen the highest number of migrations. In the year 2017, the then Chief Minister of Uttarakhand, Mr. Trivendra Singh Rawat, had formed a commission called 'Palayan Aayog' or

## Migrant Commission.

The commission submitted a report in the year 2020 about reverse migrations that took place during the Covid-19 pandemic. According to that report, about 3.57 lakh people migrated back during the pandemic, of which 29% of the people who came back during the pandemic have already returned back by the end of September, 2020.

Mr S. S. Negi, the Vice-Chairman of the commission stated that the main reason why people were abandoning their villages is due to the lack of basic facilities. Since many such villages are near the Indo-China border, this is a region of strategic importance. It's only been a year since the Indo-China conflict in Galwan; if the Chinese forces were to know about these villages near the border, this time it will be harder to push them back. These villages could be used by the enemy to make bunkers for the soldiers or can even be converted into arsenals for weapon storage.

Uttarakhand is a relatively younger state compared to its neighbours and has witnessed rapid urbanisation and deforestation. According to the State Forest Report 2019 released by the Forest Survey of India, the total forest cover of Uttarakhand decreased from 24,495 Sq. Km in the year 2007 to 24,303 Sq. Km in 2017. But this data was taken before the construction of an all-weather road for the char-dhaams started in Uttarakhand. The latest data is yet to be released by the authorities, but it is estimated that more than 50,000 trees would fall to this cause. The loss of forest cover leads to loosening up of soil, which in turn leads to landslides and soil erosion. The incidents of landslides are also very common during the rainy season, blocking the roads for hours, or even days in some areas.

The water brought by the monsoon is more than enough for the state. But then again, due to the rapid and rampant construction, the rainwater is unable to replenish the water table. Most of the

water brought by the monsoons either converts into floods or just flows into bigger rivers. The Kedarnath floods in 2013 was a calamity that an Indian can never forget. The incident is still the darkest moment in the history of Uttarakhand. The death toll was beyond human imagination—hundred died and thousands went missing, many still are. The damage to property can still be quantified, but the damage done to human lives can never be.

In order to avoid a disaster of that magnitude, some strong policies are required. Any construction activity within 800m vicinity of any river must be prohibited. Since Uttarakhand is a hilly state, there are a number of rivers and tributaries. Construction of dams such as the Tehri dam is very tedious, time-consuming, and expensive. Not to mention, the damage done to the environment is also very significant. It is proposed to construct instead of colossal dams, smaller and cost-efficient check dams.

Along with the perennial rivers, there are also a lot of seasonal rivers and streams, which overflow with water during the monsoons. If check dams are created at a distance of 7-8 km on these rivers and streams, water could be accumulated and be used for a variety of purposes by the locals. These very check dams could be used as a countermeasure against excess water during the monsoons to avoid floods.

All the issues that have been mentioned above are interlinked. To resolve the crisis, a policy must be brought where the coniferous pine tree can be replaced by tree varieties such as the Cedrus deodara popularly known as the Deodar tree. Its name is derived from the Sanskrit term devadaru, meaning wood of the gods. The plantation of these deodar trees must be twice as many. To counter not only the replacement of the pine trees, but to also reforest the greenery of the mountains. The reason for this is that the Deodar tree is an evergreen tree. It keeps the temperature of its surrounding area



cooler and the soil moist. Its wood can be used to make furniture and also has medicinal values.

Planting the deodar tree will not only replenish the lost greenery of the mountains, but will also recover the water levels of the mountains. This step can lead to a positive chain reaction. More trees planted will lead to lesser incidents of landslides, and the atmosphere will also be cooler. Consequently, with the water levels restored, the villages will be repopulated again.

The government must come up with projects which lead to a sustainable and wholesome development of the locals. The government must focus on increasing the happiness index and health index of the country, rather than focusing only on the monetary aspect.

In the words of M.K. Gandhi, “The earth has enough resources for our need, but not for our greed.” No matter how hard we try, we cannot ever give back what we have received from nature in totality, but we surely can bring sustainability to the environment so that the future is a better place for the generations yet to come.

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# Care For Yourself By Consciously Caring For The ‘Nature’: An Individualistic Approach Towards Environmental Protection

**About the Author:** Konark Pratap Gupta is a student at NLU, Delhi pursuing LL.M. in Constitutional and Criminal Law

*“When you look at a tree or a human being in stillness, who is looking? Something deeper than the person. Consciousness is looking at its creation. In you, as in each human being, there is a dimension of consciousness far deeper than thought. It is the very essence of who you are. We may call it presence, Awareness, the unconditioned consciousness. In the ancient teachings, it is the Christ within or your Buddha nature” Eckhart Tolle, Stillness Speaks (2003)*

## **“Consciousness” from the eyes of Nature**

When the person is not only aware but also aware that they are aware, a person is said to be conscious beings, thereby considering the consciousness of beings as a form of self-consciousness. The necessity of self-awareness may be interpreted in a number of ways, and what creatures would classify as conscious in the proper sense would vary accordingly.

Many non- human animals and even young children do not qualify if it is taken to include explicit conceptual self-awareness, but if only more basic implicit forms of self-awareness are needed, a wide variety of non-linguistic creatures may count



as self-conscious Consciousness (Stanford Encyclopedia of Philosophy 2020).

A conscious mental state is literally a mental state in which one is conscious of being. In this sense, conscious states include a type of meta-mentality or meta-intentionality to the degree that they include mental states that are about mental states themselves. To have a conscious desire for a cup of coffee is to have such a desire and also to be aware that one has such a desire simultaneously and explicitly. In this context, unconscious thoughts and impulses are actually those we have without understanding them, whether our lack of self-knowledge stems from mere inattention or from deeper psychoanalytic causes.

The noun "consciousness" has a number of meanings that are essentially parallel to those of the "conscious" adjective. Distinctions may be drawn between the consciousness of creatures and states as well as between the varieties of each. Honor the nature while walking or relaxing in nature by completely being there. Just be still. Oh right, look. Yeah, listen. See how every animal and plant is entirely on its own. They have not split themselves in two, unlike humans. They don't live with mental pictures of themselves, so they don't have to think about wanting to preserve those pictures and strengthen them. It's the deer itself. It's the daffodil itself.

All things are not only one with themselves in nature, but also one with the whole. By declaring a separate existence, they have not excluded themselves from the structure of the whole: 'me' and the rest of the world. The rustling of leaves in the wind, dropping raindrops, the buzzing of an insect, and the first birdsong at dawn brings knowledge of the many subtle sounds of nature. Completely give yourself to the act of listening.

You cannot feel its existence, its being, when you experience "nature" only through the mind, through thought. You see only the form and are

unaware of the existence of the sacred mystery within the form.

Thought process reduces nature to a product to be used or some other practical intent in the pursuit of profit or knowledge. Timber becomes the ancient forest, the bird a research project, the mountain that need to be mined or conquered. Let spaces with no thought, no mind, exist when you experience "nature" (Eckhart Tolle, *Stillness Speaks* (2003)). It will respond to you and participate in the evolution of human and planetary consciousness when you approach nature in this manner.

The air that you breathe is nature, as is the act of breathing itself. Pay attention to your breathing and know that it is not done by you. It is nature's air. If you had to remember to breathe, you would die quickly, and nature would prevail if you tried to stop breathing.

You're not unique from nature. We are all part of the One Life that expresses itself in the cosmos in countless ways, ways that are all entirely interconnected. You add something to the flower or the tree when you consider the sacredness, the simplicity, the amazing stillness and integrity with which a flower or a tree lives. Through your acceptance, your awareness, nature also comes to know itself. It comes through you, to realize its own beauty and sacredness! It is not to think about it, but simply to experience it, to keep it in your consciousness, to put your attention to a stone, a tree, or an animal.

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## The idea of Protection of Nature by being “Conscious”

The idea that we need to protect our environment is itself is a convoluted idea as it's not because of us the planet, environment or more specifically “Nature” is there but it's because of Planet we are there. Even seeing Human being and Nature as two different thing is itself a very wrong notion. What you are experiencing as being human is not beyond the circumference of the Nature and there is no need to tell anyone to please take care of Environment because anyhow we all don't have any other option but to anyway take care of the environment. Human being like any other animal or any creature doesn't have independent survival without the nature we cannot exist by ourselves.

People must be conscious of other life other than Human life and it won't be wrong if I say now a day's people are not even conscious about their own life. We need to be conscious of everything that is alive starting from tree to grass, grasshopper hopping to birds etc. Constantly the air around us entering us and coming out of us when we breathe is something which is keeping us alive. What trees exhale we inhale and what we exhale trees inhale and this is a continuous transaction that goes on even if we notice it or ignore it. And if I asked you to stop your breath or hold your breath for one minute then you will realize the importance of trees and become conscious of it. Similarly, on the level of water and on earth this transaction is going on. So how we keep the atmosphere, water, land and animals around us will determine the nature and quality of our life.

This is a fantastic planet which has nurtured not one or two life forms but millions of life forms including animals, plants, insects, birds, worms etc. Our ability to gobble our Natural Resources on the planet is too much. We exploited the land, oceans etc. our idea of life become exploitation from an atom to anything, we are seeing how to exploit. Every creature we have killed, everything needs to be protected. A fierce animal like tiger today needs

protection because we have not found any other way, any other vehicle through which we can expand. We are naturally thinking that exploiting the physical resource is the only way to expand. Right now, our very economics are built like this. It's all about more, more and more. This means that everybody has to buy more; everybody has to use more, but where is that “more”? We are on exploitative mode not by choice, but by Compulsiveness. The only and the only solution for this is “Consciousness”.

When humanity begins to operate out of consciousness that compulsiveness will not rule us. And when compulsiveness will not rule us, we will do just what is needed, nothing more, nothing less. We have to come to that place otherwise if God gives us another ten planets that we can live on, we will destroy all that in the next two centuries maybe.

From the time we open our eyes till we go to bed we perform different activities. Some of which we do consciously and some unconsciously like when we drive car we pay attention to the rear and back mirrors to see if any vehicle is coming from the other side or not as at that time we are aware of the simple fact that if we do not pay attention to the vehicle coming then it might leads to an accident or even can take our life. But what about the situation when we go to buy some potatoes from the market? We obviously pay attention to the product we are buying like we pay attention to the potatoes when we buy it. But do we pay attention to the carry bag which we use to buy potatoes? The answer is NO, because our conscious mind is so much involved in buying those potatoes that we literally don't care about the carry bag. Our consciousness got struck in things like:

- 1.The number of potatoes which the seller is putting while measuring it.
- 2.The quality of Potatoes whether it's Rotten or fresh etc.



This is the problem. We actually don't care that a simple plastic bag that we used to carry 1 kilogram of potatoes if thrown on the ground without proper disposal system can prevent millions of liters of rain water to go inside the ground which ultimately affects the ground water. Through this simple example I just wanted to convey how being a bit conscious regarding the Environment we can save the Nature. If during the time of buying those potatoes we become conscious about the "Nature" also like we become regarding the qualities and quantities of Potatoes then this will change the whole world.

We enjoy on Sea Beaches. We remain conscious while Diving on Sea beaches while swimming etc. but do we remain conscious when we buy the water bottle or any chips packet or when we throw its plastics rappers here and there? The answer is NO. Do we really think that if we throw plastic waste in the oceans, it can affect us so badly? We sometimes know the harmful effects of Plastics but still remain "Unconscious" while handling plastic waste. There are numerous degrading effects of Plastics on Sea and one of which has been recorded by National Geographic in its article "What Happens to the Plastic We Throw Out" as—  
*"ocean plastic is estimated to kill millions of marine animals every year. Nearly 700 species, including endangered ones, have been reported to be affected by it. Some are harmed visibly—strangled by abandoned fishing nets or discarded six-pack rings. Many more are probably harmed invisibly. Marine species of all sizes, from zooplankton to whales, now eat micro plastics, the bits smaller than one-fifth of an inch across."*

Do we really think of such effects while throwing Plastics or disposing Plastics in Sea water? No because most of the time we remain unaware or if aware of such harmful effects, then we do not remain 'Conscious' while handling Plastic wastes.

The above mentioned are only few examples from our day-to-day life which are affecting us on daily basis but we still remain unconscious about it

because our consciousness is based on our priorities.

The ultimate solution would be for people to start living "Consciously". We should never forget that we are nothing but temporary come out of the womb of the Mother Earth and one day they will be sucked back into the Earth. Through this Article I only want to say that we are part of the Earth and if Humanity has to live long then we need to think like the Earth, act like the Earth, and be like the Earth because that is what we are. We are neither part of nature nor we live in nature but WE ARE THE NATURE ITSELF!

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# GREEN CLAUSE

PART TWO



CEDM



# UNDERSTANDING OF THE BIO-MEDICAL WASTE MANAGEMENT REGULATIONS IN INDIA

About the Author: Bandana Saikia is a 2nd year BA LL. B (Hons.) student at SLS Pune.

## Introduction

The outbreak of Covid-19 has created a great havoc across the globe. The global pandemic originated in the Wuhan City of China in the month of December 2019, which started to spread rapidly across the globe. The medical researchers and various medical institutes have engaged themselves to discover a permanent prevention and treatment to such a deadly virus. The outbreak of COVID-19 has touched every notion of the human existence and there is no such exception to the environment as well. The increasing number of the usage of Personal Protection Equipment like the surgical masks, gloves and shoe covers along with other medical waste will have an adverse effect upon the environment if there is no stringent disposal mechanism available against disposing such hazardous biomedical waste. It is important for us to understand and study the ambit of Biomedical Waste Management Regulations in India covering the utmost necessity of the growing environmental degradation due to ineffective stand on proper biomedical waste management amidst the COVID-19 Outbreak in India.

## Definition of Bio-Medical Waste

According to World Health Organization, “a health care waste or bio-medical waste is a waste which is generated by health care activities which includes a wide range of materials from used needles and syringes to soiled dressings, body parts and tissues, diagnostic samples, blood samples, chemicals, medical devices and radioactive materials.”

According to the Bio-medical Waste

(Management and Handling) Rules, 1998 of India, a Bio-medical Waste is defined as- “any waste which is generated during the diagnosis, treatment or immunization of human being or animal, or in research activity pertaining thereto or in the production or testing of biologicals, and including categories as mentioned in schedule I”.

The simplified definition of Bio-medical waste can be defined as any waste which includes anatomical wastes, pathological wastes, infectious wastes which are generated out of the day-to-day medical activities in a hospital or medical research institute.

The increasing number of bio-medical waste which has been generated in the past few months in various hospitals and medical institutes in India have posed a big challenge before us for a proper bio-medical waste management mechanism. A Bio-medical waste management is a mechanism through which health care wastes are properly managed and disposed based upon its classification of wastes in order to protect the environment, general public, healthcare and sanitation employees who suffer the maximum danger of exposure to biomedical waste as an occupational hazard.

## Classification of Bio-Medical Waste

1. Infectious Waste- Laboratory cultures, waste from isolation wards, etc.
2. Pathological Waste- Human tissues or fluids, fetuses, etc.
3. Sharps- Needles, scalpels, knives, blades, etc.

4. **Pharmaceutical Waste**- Expired pharmaceutical bottles
5. **Genotoxic Waste**- Cytotoxic drugs, genotoxic chemicals, etc.
6. **Chemical Waste**- Laboratory reagents, disinfectants expired, etc.
7. **Pressurized Containers**- Oxygen tanks, gas cartridges, etc.
8. **Radioactive Waste**- Unused liquids from radiotherapy, etc.

### **International Agreements and Conventions**

The International Agreements and Conventions particularly pertaining to Bio-medical waste management is quite less in number. There are three international agreements and conventions which are addressing the issues relating to Bio-medical Waste Management (BMWM) which are important to mention.. These are-

**1. Stockholm Convention on Persistent Organic Pollutants (POPs)** - The Stockholm Convention on Persistent Organic Pollutants is an international treaty which was signed on 22 May, 2001 and came into effect on 17 May, 2004. The objective of this treaty is to protect human health and the environment from POPs. These are toxic chemicals which accumulates in the fatty tissues of living organisms and causes severe health hazards. These chemicals are produced out of medical waste incinerators and other combustion processes.

**2. Basel Convention on Hazardous Waste** – The Basel Convention on Hazardous Waste was signed on 22 March, 1989 and came into effect from 5 May, 1992. This international treaty is designed to restrict the movements of hazardous waste among countries and specifically to prevent transfer of hazardous waste from developed countries to less developed countries. The prime objective behind this convention was to protect the human health and the environment against the adverse effects resulting from the generation, management and disposal of hazardous waste generated specifically from hospitals, health centres and clinics.

**3. Minamata Convention on Mercury** - Minamata Convention on Mercury is a global treaty to protect human and environment from the adverse emissions released from mercury and its compounds. This United Nations Treaty was signed on 10 October, 2013 which was the foremost new global convention on environment and health. This treaty lays emphasis on discontinuation of certain medical equipment in health-care services which includes mercury containing medical items such as thermometers, blood pressure devices, etc.

### **Legal Position of Bio-Medical Waste Management in India**

The rise in Bio-medical waste amid the COVID-19 in India has raised a lot of concern for environment with regards to the proper Bio-medical waste disposal management laws in India. Following rules and regulations govern the Bio-medical waste management in India-

**1. The Bio-medical Waste (Management and Handling) Rules, 1998** - The Central Government in exercise of the powers conferred under section 6,8 & 25 of the Environment Protection Act, 1986 notified these rules for the management and handling of biomedical wastes generated out of hospitals, clinics and other clinical studies institutes. The Rules provide specific sets of definitions to various terms such as Biologicals, Bio-medical waste, Bio-medical waste treatment facility, and so on. It lays down the duty for the occupier of an institution which generates medical wastes to ensure such wastes are handled with proper disposal management to protect human health and the environment. These rules also highlight the treatment and disposal of the biomedical waste generated and defines segregation of the waste in terms of their forms.

**2. Biomedical Waste Management Rules, 2016** – With the growing need for dynamic changes in the field of Bio-medical waste management issues in India, it was necessary for the Government of India to implement effective new rules and hence, they



decided to publish a new set of rules, which superseded the previous one with varied alterations and additions in order to improve the collection, segregation, treatment and disposal mechanisms of these biomedical waste produced out of the hospitals and laboratories to mitigate the environmental pollution. The different sets of technologies identified under these new set of rules are incineration, microwaving, autoclaving and chemical treatment. The main objective behind the new rules is to lay emphasis on the concept of 3Rs, namely, reduce, recycle and reuse. It aims to limit the waste and recover or reuse as much as we can and avoid disposing it. These guidelines lay its focus mostly upon the application and implementation of the rules and to train the workers, immunization and safety of the workers. The ambit within the new guidelines have expanded and provide for pre-treatment of blood samples, lab waste and so on. These new rules have simplified the categorisation and authorisation.

**3. Constitutional Mandate for a Healthy and Clean Environment** – Added by the 42nd Constitutional Amendment, Article 48-A was inserted to the Directive Principles of State Policy hereby directing the State to protect and improve environment and to safeguard the forests and wildlife of the country. In *M.C Mehta v. U.O.I*, the SC counting on Article 48-A, gave directions to the Central, State and diverse local bodies and forums to take appropriate steps for the control of pollution of water. The Apex Court through its various judicial proclamations have laid emphasis that the right to live in a clean environment is a fundamental right underneath the ambit of Article 21. In various cases such as *Rural Litigation and Entitlement Kendra v. State of Uttar Pradesh*, *Vellore Citizen's Welfare Forum v. U.O.I.*, the court have given its verdict based upon the importance of a clean environment being the utmost necessity for a nation to follow. The Disposal of hazardous and toxic substance have

been recognized under Article 21 of the Indian Constitution. In the case of *Research Foundation for Science, Technology and Natural Resource Policy v. Union of India*, a writ petition was filed before the Apex Court for directing a ban on all imports of hazardous wastes, to amend the rules in conformity with the BASEL Convention and to declare that without adequate protection to the workers and public and without any provision of sound environmental management of disposal of hazardous waste, the Hazardous Wastes (Management and Handling) Rules, 1989, was violative of Fundamental Rights under Article 21, 47 and 48-A. The Court held that the directions contained in BASEL Convention have to be followed strictly by all the concerned players before any vessel is allowed to enter Indian territorial waters. The polluter pays principle will be applied whenever such violations occur.

**4. Criminal Procedure Code & Environmental Protection** – Many times the hospitals and other healthcare institutions dump their medical wastes in the municipal garbage dumps. These dumps are regularly collected by the rag pickers who search for plastics, syringes so that they can be resold for recycling especially when they are looking out for an opportunity to sustain their livelihood. All environmental pollutions can be controlled by the District and the Sub Divisional Magistrates or by Magistrates who are empowered under Section 133 to issue a conditional injunction order against a particular person and under Section 143 to issue an absolute order against general public not to repeat or continue a public nuisance, instance being disposing of biomedical waste in municipal garbage.

### Conclusion

The Central Pollution Control Board in March, 2020 has launched pointers for managing and disposal of biomedical waste generated during treatment, diagnosis and quarantine of patients who were COVID positive. The number of tests and samples being collected are rising on a mammoth rate which has adversely affected the biomedical waste

management in India posing a great threat to the environment. The guidelines issued for the BMW in India are to be strictly followed along with the recent changes made to the new guidelines issued for meeting the disposal requirement for COVID-19. It becomes necessary for prudent citizens to be aware of the rules and the guidelines issued by the Government for proper management of COVID-19 situation and keeping our surrounding clean and healthy. Also, It is high time for the legislature to enact laws pertaining to the issue of Biomedical Waste Management to be more effective.

# BIOMEDICAL WASTE MANAGEMENT DURING COVID-19 PANDEMIC IN INDIA

**About the Author:** Farzin Naz and Jayanta Boruah

## **Abstract**

What we are currently facing is an unexpected and turbulent change. This pandemic has locked crores of people in their homes, closed service organizations, and brought everything to a halt. Covid-19 is of recent origin. During this time, safe disposal of medical waste generated from examination and treatment of Covid-19 patients effectively is a must to protect the health of the people. Therefore, in this article, an attempt is made for understanding the challenges which India is facing at present and to suggest some measures which can be adopted for the proper disposal of biomedical waste.

## **Introduction**

Coronavirus generally belongs to the family of Viruses commonly known as “Coronaviridae” and

it derives its name from the Latin word “Corona” which means Crown. They are found in both animals as well as in human beings and can cause severe respiratory diseases in humans like “Severe Acute Respiratory Syndrome” also known as SARS. A new strain was identified recently and was named “nCoV”. As it was identified in the year 2019, hence it has been referred to as “Covid-19”. The first case of Covid-19 was detected in the city of Wuhan in China in December 2019. It was further declared as a Public Health Emergency by the World Health Organization in January 2020 and later was termed as a pandemic. As compared to earlier outbreaks of SARS, COVID-19 has affected the entire globe and has spread in almost every continent. As the cases continue to rise in India, the amount of waste generated during Treatment/Diagnosis/Quarantine of Covid-19 Patients is increasing day by day. Besides controlling the pandemic, the Government is facing another issue i.e., safe and scientific disposal of biomedical waste. At present, India is producing about 2, 00,000 tonnes of waste p.a. Increase in biomedical waste in the city of Pune has resulted in the breakdown of the city's only incinerator for treating bio-medical wastes. This shows that the Government has to take up necessary steps and follow proper disposal methods to prevent the spread of infection.

## **Characteristics of Biomedical Wastes Generated During Covid-19**

Wastes generated during Treatment/ Diagnosis/ Quarantine of COVID-19 Patients include Human Anatomical, Disinfectants, Discarded bed sheets, mattresses, blood, body fluids, Sharps, gloves, masks, gowns as well as other Recyclable wastes. As per WHO Guidelines, the wastes generated are highly infectious and must be properly disposed of. Such wastes are to be pre-treated and disposed of by Wastes Collectors. As the amount of discarded PPE will increase during the pandemic, thus it is suggested that additional treatment plants are to be set up and alternative techniques should be adopted for handling wastes. For water generated from washing PPE, Gloves, and Reusable aprons, it is recommended

that it should be cleaned by using soap and water and then should be decontaminated using sodium hypochlorite solution. All single-use gloves and gowns are not to be reused as they are highly infectious.

A recent study on the surface stability of the virus shows that the deadly virus can survive up to 72 hours on materials like plastic and stainless steel and for copper surfaces, it can last only up to 4 hours. Thus, the immediate environment surrounding an infected person can be a good source for the spread of infection. Currently, the studies have not proved the spread of the virus from the feces of an infected person.

### **Central Pollution Control Board's Guidelines on Management of Covid-19 Wastes**

In April 2020, CPCB came up with a detailed guideline on handling and management of biomedical wastes generated from the treatment of Covid Patients. These guidelines have to be followed along with the Biomedical Wastes Management Rules of 2016. It has specified the duties of all the stakeholders about scientific management and disposal of biomedical waste at times of the Covid pandemic. The guidelines are as follows:

**1. Isolation Wards-** Wastes generated from isolated wards at quarantine centers are to be kept in double-layered, color-coded bags and containers. Such bags should be properly labeled as "Covid-19", for better identification of Covid wastes. Diapers containing Faeces of patients should be kept in yellow bags; used PPE should be collected in red bags and masks should be kept in yellow bags.

**2. Duties of operators of CBWTF-** Operators are under the duty to provide adequate PPE to all the workers and report about the amount of collection of wastes to the concerned Pollution Control Boards from time to time. Properly sanitize the vehicle used for collecting Covid wastes.

**3. Duties of Pollution Control Boards/Committees-** All the concerned authorities have to maintain records of several wards and quarantine centers, in the respective States. To ensure that wastes are properly collected and disposed of as per the BMW Rules of 2016 and CPCB's guidelines.

**4. Duties of Local Bodies-** Furnish a report about the collection and disposal of wastes generated from quarantine centers to the concerned Pollution Control Board or Pollution Control Committees. Further, they are to assist the CBWTF by providing authorization and support to the concerned staff of CBWTF.

### **Waste Crisis**

India is fighting with another bigger problem, along with the COVID-19 pandemic, i.e. it is facing a waste crisis. Masks, gloves, PPE Kits, gowns, headgears, quarantine wastes including bed sheets and used quilt, laboratory wastes, etc. after use, ends up creating a huge amount of wastes. The discarded wastes contain almost all types of wastes like human anatomical waste, plastic wastes, and sharps. Ever growing amount of wastes has resulted in overflowing of landfills, breaking up incinerators, etc. These wastes pose a serious threat to sanitation workers and rag pickers. Although guidelines have been laid down for providing proper PPE Kits, boots, and masks to all the sanitation workers, who are at a high risk of getting infected, it is evident that they are handling these wastes by only wearing masks. In a recent report from Mumbai's Common Biomedical Waste Treatment Facility, near about 600kg of wastes in form of discarded masks and gloves ends up in landfills instead of proper incinerating sites as people are not segregating domestic wastes properly. To date, about 80 sanitation workers have tested positive, out of which 25 workers have died. Moreover, there is a suspicion amongst the scientists that Covid-19 can even affect animals since a tiger named Nadia in New York was alleged to have contracted with coronavirus from humans and similarly several other cases where both wild and domestic animals were alleged to have contracted with the virus. As such if Covid-19 wastes



are not disposed of properly and are left open then it might even affect the animals in the concerned environment. India in total only has 198 Common Bio-Medical Waste Treatment Facilities (CBMWTs) and 225 captive incinerators which were reported to have been able to recycle only 78% of Bio-medical wastes in 2017. It can therefore be easily estimated that the present scenario of waste management infrastructure might not be able to handle the huge amount of Covid-19 wastes that are generated daily which are highly infectious and are very dangerous for the survival of the ecosystem.

These measures will reduce the burden on the municipal corporations which will allow them to focus more on disposing of those wastes that are generated during the treatment of Covid-19 wastes. Separate chambers shall be constructed at alternative places where bio-medical wastes from quarantine centers, Covid-19 laboratory clinics as well as hospitals can be kept in isolation for seven days alternatively in different chambers in isolation for allowing the virus to die before disposal. However, the areas where such chambers will be constructed must be isolated from all kinds of humans, animals, or even birds.

### **Conclusion**

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During this pandemic, if bio-medical wastes generated during treatment and testing of Covid-19 patients are not disposed of properly then there will arise a major possibility of community spread of this virus, which already has created a lot of issues in the health administration of the nation. It is therefore required that more awareness regarding waste disposal shall be spread through various mediums where even NGOs, as well as other organizations or individuals, can participate in assisting the respective governments. It is not the time to criticize the government for not being able to manage such a huge amount of waste since even if the government machinery fails to address the issue due to lack of administration, we all will have to suffer the consequences which we are already suffering. Thus, besides criticizing the administration, it's the responsibility of the social media as well, to be aware of the ignorant citizens and apprise them of the measures they should take for proper disposal of such wastes. Arrangements shall be made by every citizen for disposing of their household wastes within their campus or locality itself through safe measures so that transportation of such wastes can be reduced. Those wastes that cannot be disposed of within one's campus shall be segregated and properly isolated in a safe place so that the virus could die.

# GREEN COLUMN

PART THREE



CEDM

# UN Climate Change Conference 2021: Significance And Indian Perspective

About the Author: Tanya Sharma is a Fifth Year Law student at University of Petroleum and Energy Studies, Dehradun

## Introduction

The Conference of Parties (COP) is a part of the United Nations Framework Climate Change Convention (UNFCCC) which was formed in 1944 with the aim of stabilization of greenhouse gas concentrations in the atmosphere. It also lays out a list of responsibilities for the member states which included the formulating of measures to mitigate climate change, cooperating in preparation of adoption to the impact of climate change, and promoting education, training and public awareness related to climate change.

Since 1995, COP members have been meeting every year and it comprises 198 parties including India, China, and the USA. In 1995, the first conference i.e., COP1 was held in Berlin. Thereafter in 1997, COP3 was held in Kyoto, Japan where the very famous 'Kyoto Protocol' was adopted by the member states with the aim to pursue limitation or reduction of greenhouse gas emissions. Talking about the Indian scenario, COP8 was hosted in New Delhi from 23rd October, 2002 to 1st November 2002 where the conference laid out seven measures. Some of them are namely- Strengthening of technology transfer in all relevant sectors including energy transport and the promotion of technological advances through research and development; and the strengthening of institutions for sustainable development. One of the most important conferences i.e., COP21 took place from 30th November 2015 to 11th December 2015, in Paris, France where the very popular "Paris Agreement" was signed where the member countries agreed to

work together to 'limit global warming below 2, preferably 1.5 degrees Celsius, compared to pre-industrial levels'.

## Cop26 And Its Importance

In 2021, United Kingdom will host the COP26 United Nation Climate Change Conference from 31st October to 12th November in the Scottish Event Campus in Glasgow, where leaders from more than 190 countries, including numerous negotiators, researchers and citizens will assemble to strengthen a global response to the threat of climate change. The COP26 was originally scheduled to be held in 2020, but, like several other international conferences, it was delayed due to the COVID-19 pandemic. It is a crucial movement for the world to come assemble and speed-up the climate action plan. The conference comes months after the Intergovernmental Panel on Climate Change (IPCC) published its assessment report on Earth's climate highlighting issues namely heat waves, droughts, extreme rainfall, and sea-level rise in the coming decades.

The COP26 will be important because it's been 5 years of Paris Agreement and it will be the first occasion after the Paris Climate Agreement which was concluded in 2015, where countries will be expected to "retched up" their Nationally Determined Commitments (NDC) they made as part of that agreement in 2015.

## Goals Of COP26

According to the UNFCCC, four goals of COP26 are:

### **Goal 1: Secure Global Net Zero**

The first goal of COP26 aims at securing global net-zero by mid-century and keeping 1.5 degrees within



reach. Different countries will have different pathways and will recognize the 'Principle of Common' but differentiated responsibilities. For example, United Kingdom has already committed to bringing 78% emission reductions by 2035 and is on road to net zero by 2050; China has pledged to achieve carbon neutrality by 2060; United States, under the incoming Biden administration, has rejoined the Paris Agreement and has announced its carbon neutrality commitment in 2050. Not just China, UK and US but many countries have announced their Net Zero targets with the respective decided years namely- Argentina (2050), Austria (2040), Brazil (2060), Canada (2050), Denmark (2050), France (2050), Japan (2050), and Spain (2050). However, the UNFCCC, in totality, recommends that the countries should accelerate the phase-out of coal, curtail deforestation, speed up the switch to electric vehicles and encourage investment in renewables to meet this goal.

### **Goal 2: Adapt to protect communities**

The second goal of COP26 aims at adapting to protect communities and natural habitats against the impact of climate change. The countries would achieve this goal by avoiding loss of homes, livelihoods, and lives by working together to protect and restore ecosystems; build defenses, warning systems and climate resilient infrastructure, and promote climate resilient agriculture.

### **Goal 3: Mobilize Finance**

In order to achieve the first two goals, it is very important to mobilize finance. The third goal pushes all the countries to have National Adaptation Plans in place and should share best practices to help turn out their ambition into action. It was said by UNFCCC that developed countries must fulfill their promise to mobilize at least \$100 billion in climate finance per year by 2020; however, the data from OECD shows that in 2019, developed nation's governments raised \$79.6 billion for vulnerable countries, up to 2 percent from \$78.3 billion in 2018, yet lower than the targeted \$100 billion. In a

statement given by Anne-Marie Trevelyan, UK Secretary of State for International Trade, in a release that "with the impacts of COVID-19, it is vitally important that we work together to scale up finance from all sources and improve access to finance".

### **Goal 4: Work together to deliver**

The last and important task at the COP26 is to 'finalize the Paris rulebook'. This goal needs all the leaders to work together to frame a list of detailed rules that will help in fulfilling the Paris Agreement. Article 6 of the Paris Agreement covers the role of Carbon markets and allows countries to meet a part of their domestic mitigation goals through the use of so-called "market mechanism".

### **India's Stand In Cop26**

Talking about India's perspective, then India has not given any commitment on Net Zero Emissions unlike other countries, hence, in COP26, there will be pressure on India to firstly update its NDC and replace it by more ambitious targets; secondly announce its Net Zero Target Date like UK, China, USA and other countries; and thirdly, transiting India's energy demands away from coal. According to Minister of Environment, Forest and Climate Change (MOEFCC), Bhupender Yadav, net zero commitment is not alone. He also said, *"India is focused on the 'key issues' of climate justice and sustainable lifestyles. Also, there is inequality between the demands of developed societies from developing countries on emission cuts."*

Besides, India is taking several measures to reduce carbon emissions, they are-

- India is all set to take important steps with its 450-Gigawatt renewables target and national hydrogen mission.
- India under the patronage of International Solar Alliance is set to announce the operationalization of the "One Sun One World One Grid Initiative", which is \$1 trillion Solar Investment Roadmap for 2030.
- To reduce the emissions intensity of its GDP by 33-35% by 2030 from 2005 level. There is 75%

jump in ambition over 2020.

- To increase the share of non-fossil fuel-based electricity goal by achieving 40% of electric power installed capacity from non-fossil fuel by 2030.
- To create additional carbon sink of 2.5-3 billion tons of Carbon Dioxide equivalent through additional forest and tree cover (increase of about 680-817 million tons of carbon stock).
- Lastly, to better adapt to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management.

Thus, it is advisable for India to support adaption over mitigation; however, developed countries focus indiscriminately on mitigation. Also, India must oppose climate change on the UN Security Council (UNSC) agenda otherwise it would be a great catastrophe, not only for India but also other developing countries. Further, India must highlight the financial component, which deeply concerns the developing countries, Least Developed Countries (LDCs), and Small Island Developing States (SIDS). Lastly, India must bestow intellectual leadership in the climate change realm that is often quite scientific and complex.

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