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Impact Assessment on Air Quality around Integrated Municipal Solid Waste Management Plant in Hyderabad

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Abstract: *The menace of environmental pollution due to improper municipal solid waste management (MSWM) has been enduring the human world still it is growing due to enormous growth of industries in the developing countries. Currently 2.0 billion tonnes per year of MSW is generating. Solid Waste Management process includes the collection, conveyance, segregation, treatment and disposal. Various municipal Solid waste treatment (landfilling, incineration, open burning) processes which emits the hazardous Greenhouse gases &affects Environment and Human health. This study has made an attempt on collection of data about various process involved in treatment of Hyderabad Integrated Municipal Solid Waste Management (HIMSWM) done by Ramky group PvtLtd and its impact on air. During 2018 national cleanliness survey was conducted in that Hyderabad ranked first out of 4,203 cities in Solid Waste Management. GHMC, the Greater Hyderabad Municipal Corporation, is responsible for the city's Solid Waste Management function. Hyderabad ranks among the top 5 cities in India in Solid Waste generation. In these processes Landfilling is one of the major municipal solid wastes (MSW) disposal methods practiced all over the world. Although it is considered as the most cost-effective means of waste disposal, but there are poor management practices specially in developing countries like India are the major causes of environmental pollution. Recently several studies has been carried out for the better understanding of the effects of landfill pollution on human health as well on the environment. Toxic gas emissions from landfills like Methane, NOx, SO_2, VOC's, CO_2, PM, HC, pose a serious threat to both the environment and human health. Some studies has shown that the toxic gases released from landfill sites are even responsible for the lung and heart diseases in humans beings. Landfills also generate a toxic soup known as leachate, formed when the waste is subjected to biological and physiochemical transformation process. Leachate is highly toxic and causes the land and groundwater pollution. This study focus the impact on air due to landfills, and the challenges faced in the current scenario, and the possible measures that can be taken to deal with the problem of municipal solid waste management treatment.*

Keywords: Greater Hyderabad Municipal Corporation, Hyderabad Integrated Municipal Solid Waste Management, landfilling, incineration

I. INTRODUCTION

In India solidwaste is generated from various sources day by day, the quantity of solidwaste in each sector are increased due to overpopulation, urbanization, and industrialization, Due to people habitat, lifestyle and culture of living leads generation of more solid waste. Both developed and developing countries are facing serious environmental issues because of improper planning, inefficient collection, conveyance treatment and disposal of solidwaste this causes impact on human health causes various health issues and death.

Solid waste management can be defined as the discipline associated with the control of generation, collection, storage, transfer, transport, process and disposal in a manner that is in accordance with the best principles of public health, economics, engineering, conservation, aesthetic and other environmental considerations. Solid waste comprises of all the waste arising from the human activities and animal activities that are typically solid and are discarded as the useless or unwanted. It is all-inclusive of the heterogeneous mass from the urban community as well as more homogeneous accumulation of the agriculture and the industrial wastes.

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1.1 Municipal Solid Waste

Municipal solid waste (MSW), also called the urban solid waste, that includes predominantly household waste (domestic waste) with sometimes the addition of the commercial wastes collected by municipality within a given area.

1.2 Types of Municipal Solid Waste

- Biodegradable waste: food and kitchen waste, green waste, paper.
- Recyclable material: paper, glass, bottles, cans, etc.
- Inert waste: construction and demolition waste, rocks, debris etc.
- Composite wastes: waste clothing, Tetra Parks, waste plastics such as toys.
- Domestic hazardous waste; medication, e-waste, paints, chemicals, light bulbs, fluorescent tubes, fertilizer and pesticide containers, batteries.

1.3 Composition of Municipal Solid Waste

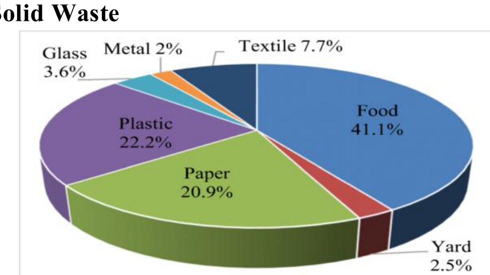

Fig 1: Composition of municipal solid waste

1.4. Status of Compliance of MSW Rules 2000

The MSW Rules 2000mandate the following seven essential steps.

1. Prohibit littering on the streets, promote segregation of recyclable waste at source and ensurestorage of waste at source in two bins; one for biodegradable waste and another for recyclablematerial.
2. Organize Primary collection of the biodegradable and non-biodegradable waste from the doorstep, ("including slums and squatter areas,) at reinforced timings on a day-to-day basis using containerized tricycle/handcarts/pick up vans.
3. Organize Street sweeping covering all the residential and the commercial areas on all the days of the year irrespective of the Sundays and public holidays.
4. Abolish open waste storage depots and make the provision of the covered containers or close the body waste storage depots.

5. Organize the Transportation of the waste in covered vehicles on a day-to-day basis avoiding multiple and manual handling of waste. Compostable Recyclable Others50.06% 15.52% 34.42%
6. Set up treatment facilities for the biodegradable waste using the composting or waste to energy technologies meeting the standards laid down in schedule IV.
7. Minimize the waste going to the land fill and dispose of only rejects from the treatment plants and inert the material at the engineered landfills meeting the standards laid down in Schedule III of the MSW Rules 2000.

1.6 Future Scenario

The details of composition of the Indian garbage 2000 and 2025 the waste composition of Indian garbage will undergo the following changes (Toxics Link, 2002).

- Organic waste will increase from 40 percent to 60 percent
- Plastic will rise from 4% to 6%
- Metal will escalate from 1% to 4%
- Glass will increase from 2% to 3%
- Paper will climb from 5% to 15%
- Others (ash, sand, grit) will decrease from 47% to 12%.

Impact on Human Health Issues Associated with Landfill Gas Emissions - Odours and Low-Level Chemical Exposures

Landfill odours often prompt complaints from community members. People may also have concerns about health effects associated with these odours and other emissions coming from the landfill. This section contains information about

- Symptoms possibly triggered by landfill gas odours.
- What scientists know about the potential health effects of exposures to landfill gas emissions.
- How environmental health professionals can assess whether landfill gas emissions may be posing a health threat.

1.6 Objectives of Study

To collect the information about quality & quantity of Municipal Solid Waste generation in Hyderabad. To collect the data about the process of collection. conveyance, disposal, treatment followed in HIMSWM. To study various MSWM treatment process involved in the Hyderabad Integrated municipal solid waste management. To study the impact on air and human health due to Landfilling at Jawahar Nagar's Integrated Municipal Solid waste management treatment plant. To collect the questionary from the people around the HIMSWM treatment plant in Jawahar Nagar about their problems. To suggest suitable measures to reduce the impact on air and human health.

II. LITERATURE REVIEW

Mohamed F. Hamodaetal., (2007) examined the atmospheric pollution Created by some waste treatment & disposal facilities in the state of Kuwait. Air monitoring was conducted in a municipal waste water treatment plant, an industrial wastewater treatment plant in a petroleum refinery, and at a landfill site used for disposal of solid wastes. Air measurements were made over a period of 6 months & included levels of gaseous emissions as well as concentration of Volatile Organic compounds (VOCs).Samples of gas & bio aerosol's are collected from ambient air surrounding the treatment facility. The results obtained from the study have indicated that presence of VOCs, methane, ammonia are dangerous. This study also revealed adverse effects on Environment & humans health.

Soumya deep Baksietal.,(2017) studied that the Industrialization becomes very significant for developing countries like India having large number of population. In recent times, E-waste & plastic waste also contribute considerably to total waste stream due to utilization of electronic & other items. There wastes may cause a potential hazard to human health & environment if any of the aspects of solid waste management is not managed effectively. This study described about the current status of municipal solid waste management in different regions of India.

Sukesh Narayan Sinha et al., (2018) studied about the adverse effects of air. Pollution due to Solid fuels on human and other organisms. Pollutants are the result of interaction of primary pollutants with air. Greater than 80% of people living in urban areas have exposure to bad quality are that exceeds the WHO limits. More than half of the world most polluted countries are from India, according to WHO which indicates the choking effects of industrial of vehicular exhausts. This

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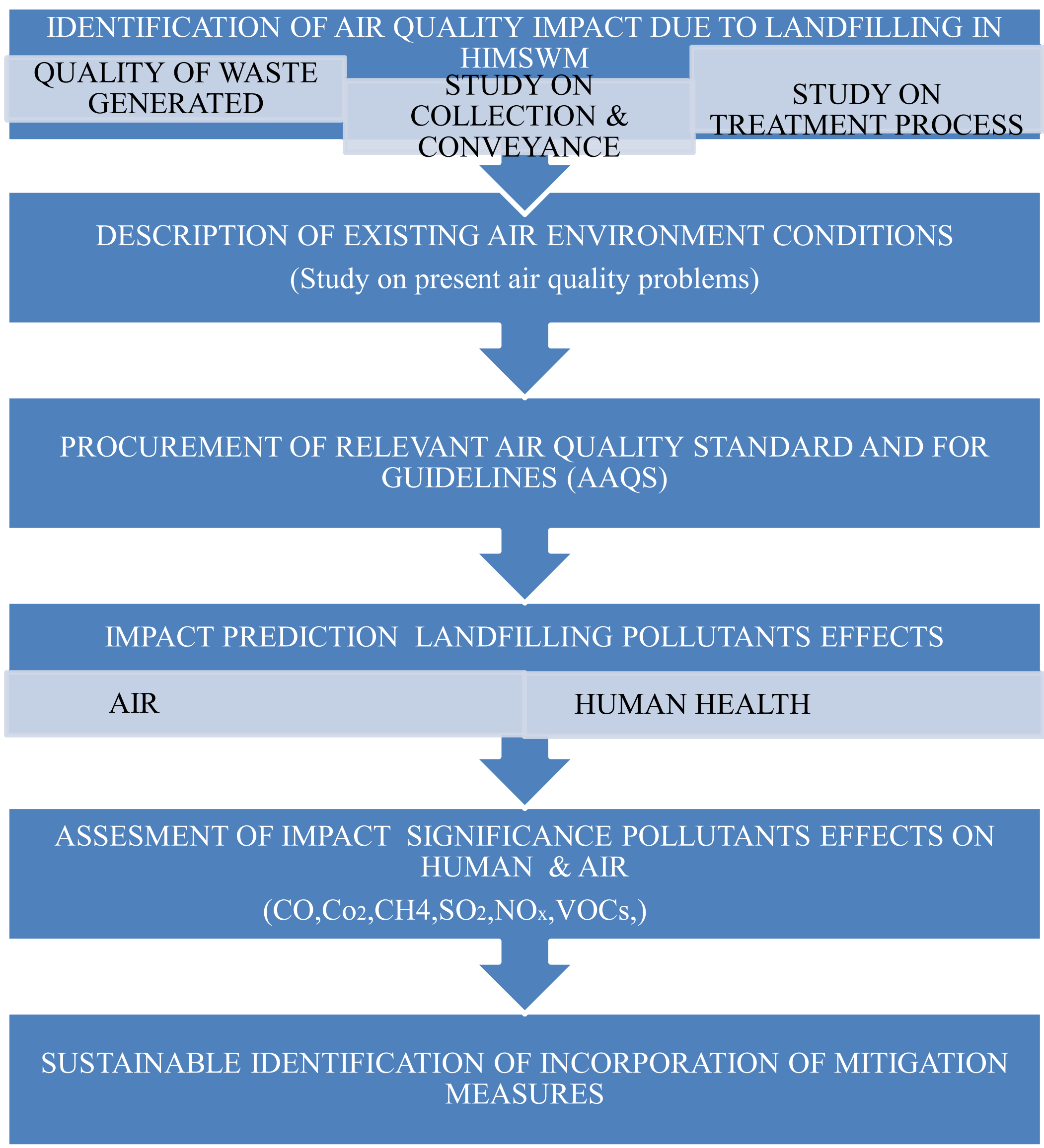
study results in Air pollution Tolerance Index. APTI as the evaluation of tolerance & sensitivity of the tree species to air pollution.

T. Lacorte& J.M. Baldasanoetal.(2018) characterized theMunicipal Solid waste incineration residues produced in two types of facilities were exhaustively characterized granulometry chemical composition, leaching behavior & element distribution. MSWI offers reduction in both mass & volume of wasted subjected to final disposal, mass wastes reduced approximately to 70% &vol to 90% & provides Energy that can be recovered produce electricity or steam. Use Analytical method with bulk samples & Analytical method with particle size distribution. As the result 1st generation (mass burn, electrostatic preceptor. as air pollution control systems) & 2nd Generation (RDF, semi-deep. Apc control system) have been characterized.

III. METHODOLOGY

This project trough light on impact on air due to landfilling,data collection done how to collect gas from landfill and measurement , monitoring of air pollutant due to lanfilling is done**.**



3.1 Description of the Study Area

Jawahar Nagar municipal solid waste treatment plantand its surroundings is under urban local body called 330 R.M. Kurakula et al. / Procedia Environmental Sciences 35 (2016) 328 – 336 Greater Hyderabad Municipal Corporation (GHMC), Hyderabad. The area under investigation belongs to Ranga Reddy district of Telangana with coordinates between 17°26' N to 17°34' N latitude and 78°32.5' E to 78° 40' E longitude. The area falls in the Survey of India (SoI) topographic map number 56K/10 to a scale of 1:50, 000.The Jawahar Nagar dumping yard utilizes an "Integrated Municipal Solid Waste Management Scheme" started in2010 by GHMC to manage the waste disposal in the city. The city produces around 4,500 metric tonnes of solid waste every day, which is transported from three collection units located in Imlibun, Yousufguda and lower Tank Bund to the garbage dumping site of Jawahar Nagar. The site is 35 km away from Hyderabad city, 10.5 km away from the state Highway connecting Hyderabad- Nagpur in West direction from the boundary of the project site. Total area: 353 acres, Encroachments – 86.60 acres, Net area available for T&D facilities is around 266.30 acres. Thelayout of Jawahar Nagar dump yard are shown in Figure 3.1 Percentage and composition of municipal solid waste in Hyderabad is shown in fig 3.2(12, 13)

3.2 Sampling Techniques

3.2.1. Landfill Gas Sampling Approaches: An Overview Many different types of landfill gas sampling approaches exist—too many to review in this manual. However, two important factors in selecting an appropriate landfill gas sampling approach include the sampling location and the sampling methods. The sampling location and sampling methods are selected according to the data uses and questions to be answered by the overall sampling program.

3.2.2. Location of Landfill Gas Monitors

Landfill gas monitors are typically placed in three types of locations at or near landfills; these are subsurface, surface, or enclosed space. The three types of monitoring locations address different landfill gas concerns and can be used either alone or together in a sampling program. Note that these systems generally do not measure landfill gas levels at points of human exposure. Subsurface systems measure concentrations of contaminants in the soil gas at locations beneath the soil-air interface. The depth of sampling can range from a few inches to many feet below the surface. Surface systems measure concentrations of gas within a couple of inches above the soil-air interface. Enclosed space systems monitor gases in indoor air or confined areas overlying or adjacent to landfills, such as buildings, subsurface vaults, utilities, or any other spaces where the potential for gas buildup is of concern.

In addition to the sampling location, several methods of landfill gas collection can be used in a landfill gas sampling approach. Examples of these methods, and their implications, follow:

3.2.3 Portable vs. Stationary Sampling Equipment

Some gas sampling can be performed with portable monitors, which typically are hand-held instruments that can be easily carried around a landfill. This type of device is useful for conducting an initial screening of landfill gas migration pathways or for identifying the source of methane leaks. Stationary monitors, on the other hand, usually are installed at fixed locations, where they remain for the duration of the intended monitoring. Stationary monitors are typically, though not always, capable of generating higher quality data than portable monitors.

3.2.3 Grab Sampling vs. Continuous Monitoring

This distinction applies to most types of landfill gas monitoring (e.g., soil gas, emissions, ambient air, and indoor air). By definition, grab sampling is a one-time measurement of gas concentrations, thus providing a "snapshot" of landfill gas composition at a given place and time. This type of sampling is generally not useful for evaluating changes in landfill gas composition over the long term, unless it is conducted at regular intervals according to a detailed plan. In contrast, continuous monitoring devices constantly sample and analyze gas concentrations. Some are capable of documenting fluctuations in concentrations over short intervals, while others can measure only average concentrations. All continuous monitors, however, provide insight into changes in gas composition over the long term.

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3.3 Explosion Hazards

Landfill gas may form an explosive mixture when it combines with air in certain proportions. This section provides information about:

- The conditions that must be met for landfill gas to pose an explosion hazard.
- The types of gases that may potentially pose explosion hazards.
- What can be done to assess whether a landfill is posing an explosion hazard.

IV. RESULTS AND DISCUSSIONS

4.1 Impact due to Treatment Process

The environmental impact of various solid waste treatment methods being used in Hyderabad was assessed to provide useful information for decision making in solid waste management strategy. Among the treatment methods considered, the incineration method and the anaerobic digestion method are the most environmentally friendly, while the landfill method has the highest environmental impact. Regarding the life cycle of the treatment methods, the environmental impact of the main treatment stage is the largest, contributing 46–94% of the total impact, depending on the treatment method.

Major developments have occurred with respect to landfill technology and in the legislative To meet regulatory requirements. According to EPA regulations under RCRA (Subtitle D), MSW landfills must conduct soil gas monitoring for methane. Depending on the date of construction, some MSW landfills. EPA regulations provide flexibility for how states and Indian tribes implement these regulations. As a result, landfills operating in some states or tribal areas might be subject to different regulations than landfills operating in other areas. The data collected in fulfillment of these regulations serve two important purposes: they provide environmental regulators with information about the performance of landfill gas collection systems, and they characterize the extent to which accumulation and migration of landfill gas might pose an explosion hazard. MSW landfills must monitor methane around the landfill perimeter.

4.2 Impact on Air

4.2.1 Carbon Monoxide (CO)

Carbon monoxide (CO) is a colourless, odourless, tasteless, deadly gas. You can't see, smell or taste it. Carbon monoxide is slightly lighter than air and quickly spreads throughout an entire house. Carbon monoxide gas is produced when fossil fuel burns incompletely because of insufficient oxygen. During incomplete combustion, the carbon and hydrogen combine to form carbon dioxide, water, heat, and deadly carbon monoxide. In properly installed and maintained appliances gas burns clean and produces only small amounts of carbon monoxide. Anything which disrupts the burning process or results in a shortage of oxygen can increase carbon monoxide production. Wood, coal, and charcoal fires always produce carbon monoxide, as do gasoline engines.

4.2.1.1. Effects of carbon monoxide on Human Health

Carbon monoxide symptoms mimic the flu: headaches, fatigue, nausea, dizziness, confusion, and irritability. Continued exposure can lead to vomiting, loss of consciousness, brain damage, heart irregularity, breathing difficulties, muscle weakness, abortions and even death. Because the symptoms mimic so many illnesses, it is often misdiagnosed.

When CO is inhaled, it bonds with haemoglobin, displacing oxygen and forming carboxyhaemoglobin (COHb) resulting in a lack of oxygen to the body cells. The attraction of CO and haemoglobin is approximately 250 times greater than the attraction between oxygen and haemoglobin. The brain and heart require large amounts of oxygen and quickly suffer from any oxygen shortage. This makes even small amounts of carbon monoxide dangerous. Physical, non-reversible damage can occur. Continued exposure to carbon monoxide can cause permanent brain, nerve, or heart damage. Some people require years to recover while others might never fully recovered. The time of exposure, the concentration of CO, the activity level of the person breathing the CO, and the person's age, sex, and general health all affect the danger level. When people lose consciousness due to carbon monoxide poisoning, they will typically have relapses for several weeks. They will suffer from headache, fatigue, loss of memory, difficulty in thinking clearly, irrational behaviour, and irritability. Recover can be slow and frustrating. Some individuals suffer permanent brain and organ damage. Victims may be highly sensitive to C for the rest of their lives.

4.2.2 Methane(CH_4)

- Methane, or methyl hydride, is a colourless, odourless gas which is lighter than air. In the atmosphere, the gas is transformed into water and carbon dioxide; it is also one of the most potent greenhouse gases.
- Methane is naturally emitted from the decomposition of organic matter and digestive process of ruminant animals; other sources include fossil fuel extraction, landfill, industrial process, food production and mining. It is commonly referred to as marsh gas, as it occurs abundantly in wetlands.
- Methane is the constituent of landfill gas that is likely to pose the greatest explosion hazard. Methane is explosive between its LEL of 5% by volume and its UEL of 15% by volume. methane concentrations within the landfill are typically 50% (much higher than its UEL), methane is unlikely to explode within the landfill boundaries. As methane migrates and is diluted, however, the methane gas mixture may be at explosive levels. Also, oxygen is a key component for creating an explosion, but the biological processes that produce methane require an anaerobic, or oxygen-depleted, environment. At the surface of the landfill, enough oxygen is present to support an explosion, but the methane gas usually diffuses into the ambient air to concentrations below the 5% LEL. In order to pose an explosion hazard, methane must migrate from the landfill and be present between its LEL and UEL.

4.2.2.1 Effects of Methane on Human Health

- **Benzene***:* Benzene has been linked to cancer, anaemia, brain damage, and birth defects, and it is associated with respiratory tract irritation. Over time, benzene exposure can also lead to reproductive, developmental, blood, and neurological disorders. Benzene is a constituent of raw gas, so leaks and deliberate releases of gas (venting) are the primary source of benzene pollution from the oil and gas industry.
- **Ethylbenzene**: Exposure to ethylbenzene has been associated with respiratory and eye irritation, as well as blood and neurological disorders. Like benzene, ethylbenzene is a constituent of raw gas and leaks and venting sources are the primary sources of ethylbenzene.
- **Formaldehyde***:* Formaldehyde has been linked to certain types of cancer, and chronic exposure to it is known to cause respiratory symptoms. Formaldehyde is primarily emitted from combustion sources such as flares and compressor engines.
- **Other landfill gases.** Other landfill gas constituents (e.g., ammonia, hydrogen sulphide, and NMOCs) are flammable. However, because they are unlikely to be present at concentrations above their LELs, they rarely pose explosion hazards as individual gases. For example, benzene (an NMOC that may be found in landfill gas) is explosive between its LEL of 1.2% and its UEL of 7.8%. However, benzene concentrations in landfill gas are very unlikely to reach these levels. If benzene were detected in landfill gas at a concentration of 2 ppb (or 0.0000002% of the air by volume), then benzene would have to collect in a closed space at a concentration 6 million times greater than the concentration found in the landfill gas to cause an explosion hazard.

4.3. Sulphides

- Hydrogen sulphide, or H_2S, is a flammable, explosive, and toxic gas in the environment. It's known for its rotten egg smell and is sometimes called sour gas or stink damp. The gas is very dangerous for humans at high concentrations. In very low concentrations, however, it's a normal component in our bodies, where it actually has benefits.
- H_2S is released from decomposing organic matter, geothermal activity, and industry. It's widespread in the atmosphere but is more concentrated in some environments than in others. It's a potential problem in the oil and gas industries.
- Hydrogen sulphide in the atmosphere can make breathing difficult and damage the nervous system. The more concentrated the H_2S, the more pronounced its effects. It can be deadly at high concentrations.
- Hydrogen sulphide, dimethyl sulphide, and mercaptans are the three most common sulphides responsible for landfill odours. These gases produce a very strong rotten-egg smell—even.

4.3.1. Effects of Sulphides on Human Health

Humans are extremely sensitive to hydrogen sulphide odours and can smell such odours at concentrations as low as 0.5 to 1 part per billion (ppb). At levels approaching 50 ppb, people can find the odour offensive. Average concentrations in ambient air range from 0.11 to 0.33 ppb (ATSDR 1999a). According to information collected by the Connecticut Department of Health, the concentration of hydrogen sulphide in ambient air around a landfill is usually close to 15 ppb.

- Hydrogen sulphide in the atmosphere can make breathing difficult and damage the nervous system. The more concentrated the H_2S, the more pronounced its effects. It can be deadly at high concentrations.
- Eye, nose, and throat irritation, headache, nausea, stomach upset, dizziness, difficulty breathing due to irritation of the lungs, coughing, insomnia

4.4 Ammonia

- Ammonia - NH_3 - is a gas commonly used as a refrigerant in cooling systems.
- The gas is colourless with very sharp odour.
- In small concentrations the gas is detectable by smell. In high concentrations the gas is an immediate hazard to life.
- Ammonia is another odorous landfill gas that is produced by the decomposition of organic matter in the landfill. Ammonia is common in the environment and an important compound for maintaining plant and animal life. People are exposed daily to low levels of ammonia in the environment from the natural breakdown of manure and dead plants and animals. Because ammonia is commonly used as a household cleaner, most people are familiar with its distinct smell.

4.4.1. Effects of Ammonia on Human Health

Humans are much less sensitive to the odour of ammonia than they are to sulphide odours. The odour threshold for ammonia is between 28,000 and 50,000 ppb. Landfill gas has been reported to contain between 1,000,000 and 10,000,000 ppb of ammonia, or 0.1% to 1% ammonia by volume (Zero Waste America n.d.). Concentrations in ambient air at or near the landfill site are expected to be much lower.

- Breathing 700 to 1,700 ppm results in coughing, bronchospasm and chest pain along with severe eye irritation and tearing.
- At levels greater than 5,000 ppm, ammonia causes chemical bronchitis, fluid accumulation in the lungs, chemical burns of the skin and is potentially fatal.

4.5. NMOCs

Some NMOCs, such as vinyl chloride and hydrocarbons, may also cause odours. In general, however, NMOCs are emitted at very low (trace) concentrations and are unlikely to pose a severe odour problem.

4.5.1. Effects of NMOCs on Human Health

Health effects may include cardiovascular effects such as cardiac arrhythmias and heart attacks, and respiratory effects such as asthma attacks and bronchitis. Exposure to particle pollution can result in increased hospital admissions, emergency room visits, absences from school or work, and restricted activity days, especially for those with pre-existing heart or lung disease, older people, and children.

Various Gases Ass Per Naaqs Exposure Level And Its Impact Are Presented In Table 3 to

Table 1: Gases and its effects

Components	**Potential to pose an explosive Hazard**
Methane	Methane is highly explosive when mixed with air at a volume between its LEL of 5% and its UEL of 15%. At concentrations below 5% and above 15%, methane is not explosive. At some landfills, methane can be produced at sufficient quantities to collect in the landfill or nearby structures at explosive levels.
Carbon dioxide	Carbon dioxide is not flammable or explosive.

Nitrogen dioxide	Nitrogen dioxide is not flammable or explosive.
Oxygen	Oxygen is not flammable, but is necessary to support explosions.
Ammonia	Ammonia is flammable. Its LEL is 15% and its UEL is 28%. However, ammonia is unlikely to collect at a concentration high enough to pose an explosion hazard.
NMOCs	Potential explosion hazards vary by the chemical. For example, the LEL of benzene is 1.2% and its UEL is 7.8%. However, benzene and other NMOCs alone are unlikely to collect at concentrations high enough to pose explosion hazards.
Hydrogen sulfide	Hydrogen sulfide is flammable. Its LEL is 4% and its UEL is 44%. However, in most landfills, hydrogen sulfide is unlikely to collect at a concentration high enough to pose an explosion hazard.

Table-2. Health effects associated with Landfill gas emissions

Oxygen Concentration	Health Effects
21%	Normal ambient air oxygen concentration
17%	Deteriorated night vision (not noticeable until a normal oxygen concentration is restored), increased breathing volume, and accelerated heartbeat
14%-16%	Increased breathing volume, accelerated heartbeat, very poor muscular coordination, rapid fatigue, and intermittent respiration
6%-10%	Nausea, vomiting, inability to perform, and unconsciousness
Less than 6%	Spasmatic breathing, convulsive movements, and death in minutes

Table-3. National ambient air quality standards

Pollutants	Primary Standards	Average Time	Secondary Standards
Carbon Mono oxide	9ppm (10 mg/m^3)	8-hour	Noneµ
	35ppm (40 mg/m^3)	1-hour	
Lead	0.15 µg/m^3	Rolling 3-month average	Same as Primary
Nitrogen Dioxide	53ppb	Annual (Arithmetic average)	Same as Primary
	100ppb	1-hour	None
Particulate Matter (PM10)	150 µg/m^3	24-hour	Same as Primary
Particulate matter (PM 2.5)	15.0 µg/m^3	Annual	Same as primary
	35 µg/m^3	24- hour	Same as Primary
Ozone	0.075 ppm(2008std)	8-hour	Same as Primary
	0.08 ppm (1997std)	8- hour	Same as Primary
Sulfur Dioxide	0.03 ppm	Annual	0.5ppm
	0.14 ppm	24- hour	3-hour
	75 ppb	1-hour	None

Table-4. National Air Quality Index

Pollutant	Average Period	NAAQS
CO	1-HOUR	40000
	8-HOUR	10000
OZONE	8-HOUR	75 PPB

Table-5.: Concentration of Ambient Air

Pollutants	Time-weighted average	Concentration of ambient air (InΩ/m^3)		
		Industrial area	Residential area	Sensitive area

Pb	3-MONTH ROLLING	0.15
PM10	24-HOUR	150
PM 2.5	24-HOUR	35
	ANNUAL	12
NO2	1-HOUR	188
	ANNUAL	100
SO2	1-HOUR	196
	3-HOUR	1300

SO_2	Annual average 24hr	80 120	60 80	15 30
NO_2	Annual average 24hr	80 120	60 80	15 30
SPM	Annual average 24hr	360 500	140 200	70 100
RSPM	Annual average 24hr	120 150	60 100	50 75

4.6Ambient Air Quality Monitoring

The ambient air quality monitoring network involves measurement of a number of air pollutants at number of locations in the country so as to meet objectives of the monitoring. Any air quality monitoring network thus involves selection of pollutants, selection of locations, frequency, duration of sampling, sampling techniques, infrastructural facilities, man power and operation and maintenance costs. The network design also depends upon the type of pollutants in the atmosphere through various common sources, called common urban air pollutants, such as Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM), Sulphur dioxide (SO2), Oxides of Nitrogen (NOx), and Carbon Monoxide (CO) etc. The areas to be chosen primarily are such areas which represent high traffic density, industrial growth, human population and its distribution, emission source, public complaints if any and the land use pattern etc. Generally, most of the time the basis of a network design are the pollution source and the pollutant present.

4.7 National Ambient Air Quality Standards (NAAQS)

The ambient air quality objectives/standards are pre-requisite for developing programme for effective management of ambient air quality and to reduce the damaging effects of air pollution. The objectives of air quality standards are:

- To indicate the levels of air quality necessary with an adequate margin of safety to protect the public health, vegetation and property.
- To assist in establishing priorities for abatement and control of pollutant level;
- To provide uniform yardstick for assessing air quality at national level; and
- To indicate the need and extent of monitoring program.

V. CONCLUSION

The present study revealed that there is a need to focus on the air quality management for such sites to safeguard public health and further research is required to measure the ambient air quality of MSWM sites and their health hazards. So, the implementation of the policies is essential to manage the levels of pollutants in the ambient air of MSWM sites and to reduce its effect on health and climate.The current consideration of the pollution emission for this model is restricted to the four air pollutants due to the fact that realworld data of the other pollutants are insufficient at the moment. In addition, the optimization model of this study is a LPbased model with a single objective function. The multi objective programming techniques can be used to obtain a trade-off solution between economic factors and environmental impacts in the future study.

That is why even after knowing that the air is getting polluted every day, the organizations around the world are unable to provide a good solution to it. As a human being, we must contribute, that is why, we need to gather and make sure that all the places, suffering from air pollution, should get organized in a manner so that air pollution should not exist. Everyone should participate in schemes like Swachh Bharat Abhiyan which will not only reduce the air pollution in the country but will also reduce various other kinds of pollution.The need for investigating and monitoring sea water and sediment quality in these landfills is advisable. Concentrations and fluxes of contaminants and their impact in the area should be assessed. With this study we can compare the data obtained in these landfills with other landfills and observe the different levels of emission. Population growth is a major contributor to increasing solid waste in India. Growth of mega cities in India Megacities are a relatively recent phenomenon, associated with globalization of the economy, culture and technology. Municipal solid waste open dump site operation is an important element of waste management in India both today and in the future. Dump site fires are common occurrences in the study area. When they do occur, however, they tend to attract a great deal of the public attention and challenge the fire service. Dump site fires in the study area could threaten the health of anyone especially the dump site workers that are regularly exposed to the thick smoke. This study suggests that exposure to chemicals and other substances emitted from dump site fires is high especially, suspended particulate matter, carbon dioxide.

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