

**VIOLA IRENE NANSAMBA**

**UB41283BMA50012**

**MANAGEMENT**

INTRODUCTION TO GLOBAL WARMING AND WASTE MANAGEMENT

**ATLANTIC INTERNATIONAL UNIVERSITY**

**HONOLULU, HAWAII**

**2022**

**DATE SEPTEMBER 2022**



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**INTRODUCTION**

Global warming is when there is gradual increase in the overall temperature of the earth which is attributed to the greenhouse effect through increased levels of carbon dioxide, hydrofluorocarbons (HFCs) and other pollutants like waste materials. All over the world, this is the biggest worry because it affects everyone and everything.

In the article, Global warming by Henrik Selin (2022), the phenomena is about increasing air temperatures near the surface of the earth over the past one to two centuries. According to observation by climate scientists, there are various temperatures, precipitations and storms, which have influence on the climate. The data indicates that the earth’s climate has changed since the beginning of geological times and human activities.

Waste is unwanted or unusable material that is worthless, defective and of no use. According to the Basel Convention on the control of Transboundary Movements of Hazardous Wastes and their Disposal of 1989, Article 2(1), “Wastes are substances or objects, which are intended to be disposed of or are required to be disposed of by the provisions of national law. The European Union defines waste as; “an object the holder discards, intends to discard or is required to discard.”

Acute hazardous wastes are those that pose a threat to human and the environment, even when they are properly managed. This waste is on the F-list at 40 CFR 261.31 and identified by code **H** and includes almost every form of dioxin-bearing waste. These are mostly commercial products.

Waste management (waste disposal) is the process and action required to manage waste from its inception to its final disposal. The breakdown includes collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process and waste related laws, technologies, economic and mechanisms.



**Literature review**

With the growing observation of the science community, the Intergovernmental Panel on Climate Change (IPCC) was formed in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Program (ENEP).The IPCC report produced in 2018 noted that human beings and their activities have been responsible for a worldwide average temperature increase between 0.8 and 1.2⁰C (1.4 and 2.2⁰F).

One of the contributing factors to global warming is poor waste disposal systems and laws. Huun Kate (2020) emphasized that not only emission of gasses contributes to global warming but also the organic and inorganic waste that we produce contributes as well. Waste is referred to by various names like; refuse, trash, litter, scraps, rubbish, garbage, junk, debris, sewage, remains and leavings.

Waste is in three forms of matter; liquid, solid and gases (fumes, dusts, mists, vapors). Solid waste maybe a combination of solid wastes. This may depend on the quantity, concentration, physical, chemicals and infectious characteristics that may pose a hazard to the human, health and environment.

Sources of waste are broadly classified as; industrial, commercial, domestic and agricultural. As per the Basel convention, there are two main categories in place that is **non-hazardous** or solid waste and **hazardous waste**. Generators are categorized depending on the quantity of waste they create. The breakdown is as follows;

*Conditionally Exempt Small Quantity Generator* (CESQG) generates up to 100kg (220lbs) of hazardous waste per month or up to 1kg of acutely hazardous waste per month.

*Small Quantity Generator* (SQG) generates more than 100kg (220lbs) but less than 1,000kg (2,200lbs) of hazardous waste per month and not more than 1kg of acutely hazardous waste per month.

*Large Quantity Generator* (LQG) generates over 1,000kg (2,200lbs) of hazardous waste per month, or more than 1kg acutely hazardous waste a month.

The production and incineration of inorganic waste uses natural resources like wood, water, fuel and metal in their production and these result in the emission of greenhouse gases. When organic waste decomposes, carbon dioxide and methane are created. Plastics also greatly contribute to the emission of the greenhouse gases as well during every stage of their life cycle.



Incineration, deposition, injection, dumping, spilling, leaking or placing of solid waste into water or the land is ways in which they enter the environment. This causes emission of gases into the air or is discharged to the waters. All these come from waste disposal (management) and they have side effects to the environment that may in the long run cause changes in the climate.

*Fig.1 shows waste generation chart, Georgia, USA.*

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| Composition of Waste Disposed in Georgia in 2004 |
| http://faculty.mercer.edu/mccreanor_pt/eve420/Lesson04-Composition/images/GeorgiaDisposedWasteComposition-2004.jpg  2004 Georgia Total Waste Disposal – 15.8 million tons |
| Source Data:  [Georgia Department of Community Affairs - Final Report - Georgia Statewide Waste Characterization Study; June 22, 2005](http://faculty.mercer.edu/mccreanor_pt/eve420/Lesson04-Composition/documents/GeorgiaWasteComposition.pdf) |



In the process of waste management, there are various parties concerned. *Disposer* is any person to whom hazardous wastes are shipped and who carries out disposal of wastes. *Carrier* is any person who carries out transport of hazardous waste.*Licenced party* is the one in charge of offsite removal of solid waste at any time after generation. Disposal is the operation which may lead to resource recovery, recycling, reclamation, direct re-use or alternative uses. *Generator* is any person whose activity produces hazardous wastes or any other wastes.

Evidence suggests that humans are a contributing factor to global warming which has led to climate change through generation and disposal of waste. In a consumerist society, products are disposed of at very high rates. According to the European Union report, the impact of solid waste management on the global warming, gas emissions mostly comes from methane (CH4).This is released by biodegradable matter decay in anaerobic landfill conditions.

*Fig.2 shows waste burning and emission of smoke to the atmosphere.*



Global warming is increasing probably because there is also increase in population, urbanization and technology. All this comes with a price which increases generation of waste. Whether the waste is burned or not burnt there is still impact. Some wastes in the absence of oxygen emit gases (Land Fill Gases) and while others when flared they also emit gases. Methane is common in both scenarios and it traps 25 times more heat in the atmosphere than carbon dioxide.



Dangers of global warming

The dangers of global warming are appalling, perhaps if we delve into them then we can realize what deep waters we are treading. Global warming is understood in some parts of the world, well as in other parts of the world, it’s more of a myth. Sometimes ignorance is bliss only if doing the right thing without knowing and the reverse is true.

In the poor communities, the hazardous waste is much less than the informed urban communities. The disposal is also controlled, like turning the waste into fertilizers to sustain farming. Regardless of all of that, global warming affects everyone and everything. Cho Renee (2019), Harris Martin (1996), Sim Stuart (2009), Lashof Daniel A (1997), Wilson H.W (2009) and Farber Madeline (2017) have also shared their views about the dangers and below is the breakdown;

*Water shortage causing frequent droughts and water quality depreciation,* increasing world temperatures is the main contributing factor to this problem. When the climate changes, there is impact on the water cycle. Warmer air will suck up more water from the oceans, lakes, soils and plants. The dry conditions affect drinking water supplies and agriculture. This will definitely lead to droughts and uncertainty about when there will be rainfall.

*Increase in fire threats,* this is due to increase in temperatures which in turn also enhances the drying of the plants in forests. This has indeed almost doubled in numbers of large fires since the 1980s.The wild fire season has increased in frequency as well as lengthened. Warmer springs, longer summers, drier soils and vegetation do not help matters at all. In Australia, United States of America to mention but a few, the wild fires are on the increase.

*Stress on the eco system,* when there is prolonged droughts, floods, wild fires and pollution, the ecosystem and species are going to be affected. In addition to all that the system and species are already threatened by human activities which has absolutely destroyed and fragmented their habitats. Global warming disrupts the ecological balance between the plant and animal species thereby reducing biodiversity. Endangerment of species and extinction is a result thereafter.



*Weed and pest invasions,* actually this may not immediately relate to increase in weeds and pests but introduction of totally new weeds and pests.Crop pests and diseases move at about the same speed as warm temperatures. As a matter of fact, several new strains of fungi have emerged in the recent years around the world. This has really affected agriculture and led to introduction of more pesticides that are also pollutants.

*Disruption in travel,* one would wonder how global warming is a danger to travel but ironically they are intertwined. Airlines are forced to limit the number of passengers and also the cargo. According to research, the warmer the air, the harder it is for the airplane to take off. Travel plans are affected by rising temperatures and heat waves. When the plans of travel are disrupted then other businesses are affected as well.

*Increase in food prices,* if there is prolonged droughts, floods, high temperatures, pests, weeds and dry soil then how would food prices not be affected? That’s really impossible. The quality would be affected as well, imagine buying food at high prices but lacking most of the nutrients. It is an abomination but sadly true.

*Higher electricity bills,* the unpredictable weather conditions for example; increase in temperatures, excessive rains and droughts in some parts of the world all are in synch with global warming and are a contributing factor to increase in electricity bills. The consumption patterns increase like, more usage of the air conditioners (AC), prolonged refrigeration and other cooling appliances. This is already a concern in very many countries around the world. The bills are undoubtedly soaring high leading to high cost of living.

*Health issues resulting in illness and death,* worsening of health conditions especially in the tropics like Africa due to increase in temperatures. This ideally leads to multiplication of more mosquitoes that cause malaria, dengue and other insect-borne infections. Increased temperatures are no joke to people with heart problems as the cardiovascular system must work harder to cool the body. The lung tissues are damaged as well due to high temperatures which may adversely affect people with asthma and other respiratory diseases. Also a spike in allergic reactions is realized as a result of the air pollution.

*Outdoor work will reduce;* this is a direct impact of global warming. Extreme heat hinders productivity especially for outdoor activities. The depletion of the ozone layer affects ultra violet (UV) radiation levels at the surface of the earth which exposes people doing outdoor activities to intense UV radiation. This will result in adverse eye effects, skin cancer and possibly immune dysfunction.



*Heat stress,* higher temperatures also cause heat stress which results in heat stroke, heat exhaustion, fatigue and dehydration. All this causes risk of injury due to dizziness and constant headaches. In worst scenarios this can lead to cardiac arrest leading to death. If at all the people are affected, then definitely the animals and plants will be affected as well.

*Rising home and health insurance premium,* whenever there is a change and especially a negative change, everything is affected. The result will be wild fires, floods, infectious disease outbreak, extreme heat, chronic diseases and the list goes on. The rates for both housing and health insurance definitely skyrockets due to the damages caused. The irony is that communities most affected by floods, wild fires, infestation are actually the ones that are least able to afford the higher premiums and that could only mean one thing, lose everything.

*Battered coasts,* the effects of global warming could be devastating to vulnerable coastal and marine areas. The increase in the sea level changes the shape of the coastline and contributes to coastal erosion. As a result of this, there is flooding and more underground salt-water intrusion. This leads to increased rates of beach and bluff erosion along the coast. All this affects the marine animals and the livelihoods of the people in the surrounding areas.

*Mass emigration,* who would want to stay in a place that is flooded, extreme heat conditions and plagued by various diseases? Absolutely no one. Circumstances force people to move from one area to another because they are left with no choice. This causes uneven population distribution whereby some places are overcrowded and others are sparsely populated. With all this the cycle is repeated due to more emissions of the greenhouse gases in those areas that are densely populated.

*Rapid climate change,* there is a worsening change in temperatures which leads to storms, heat waves, floods and droughts. A warmer climate creates an atmosphere that that collects and retains more water which influences the weather patterns. The wet areas become wetter and the dry areas become drier. The climate changes endanger the environment and the costs in health and damages are so high. Prolonged dry spells have caused death, crop failure and heavier rains have caused damage to properties and contamination of water.



*Fig.3 shows an illustration of dangers of global warming.*

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| See the source image |
| See the source image |



Waste management to mitigate the impact of climate change due to global warming

Waste management is intended to reduce the appalling effects of climate change due to global warming. The aim is to curb down the dangerous effects of the waste on the environment. It should be noted that this is not restricted to government but it’s a collective effort from everyone regardless. If everyone realizes the impact they have on the environment through careless disposal of waste then the world would be in a better place.

Proper management of waste would go a long way in providing hygienic, efficient and economic solid waste storage, collection, transportation and treatment or disposal of waste without polluting the atmosphere, land or the water bodies. This can be achieved through the following;

5Rs concept: **R**efuse **R**euse **R**educe **R**epurpose **R**ecycle

Refuse, it would be a great idea if unnecessary packing materials are substituted with biodegradable materials.Across the world, multiple companies manufacture packaging materials that are hazardous to the environment due to their nature. The materials used to manufacture them are substandard which makes it hard to get rid of them completely when not needed anymore. It is absolutely important to refuse to use single use plastics to minimize the amount of daily waste.

Reuse, this is a smart decision to make as a government, organization or as an individual. Reduction in usage of harmful and non-recyclable materials is very important but it also saves money. It’s important not to depend on such products which in turn can lead to less waste materials ending up in the landfills. More waste in landfills creates a negative impact on the environment. Only use minimal amounts that are required to avoid excessive waste. Start with simple things like instead of printing on one side of paper, print on both sides to avoid lots of output that ends up in being wasteful.

Reduce, in a move to reduce waste, businesses should reuse items instead of replacing them. Pay attention to particular sections of the business like the cafeteria, encourage the staff to use their own cup instead of disposable cups. For batteries go for the option

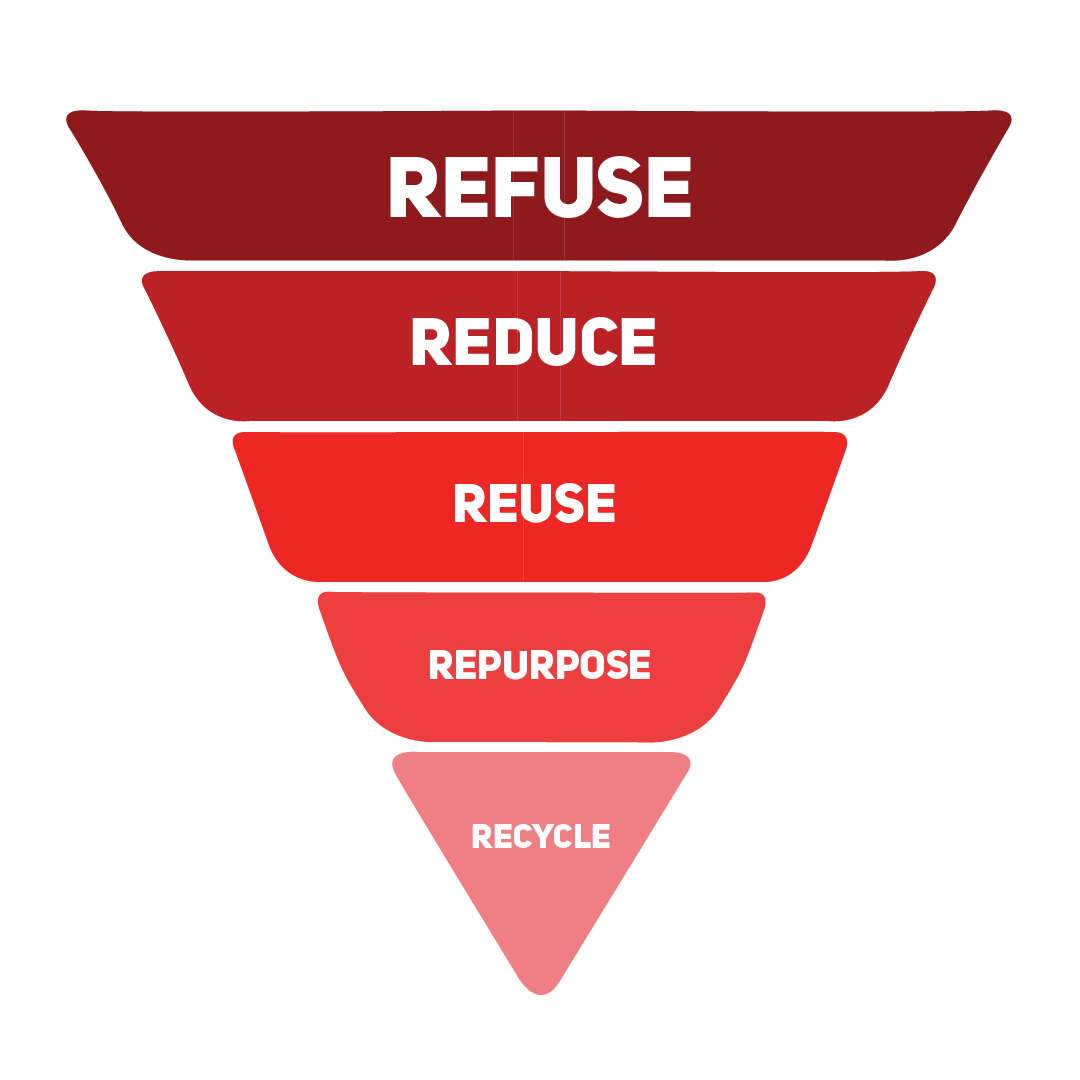


of rechargeable batteries instead of single use. Order for supplies in bulk packed in the same container instead of retail that accumulates many unwanted containers. Reducing is achieved once the mindset is focused and it also saves lots of money and less waste eventually.

Repurpose, if it’s not possible to refuse, reduce or reuse an item try upcycling.Upcycling means use the given item for different purposes. For example a broken tea pot can be turned into a decoration feature in an art piece. If space is available, collect all the unused items and store them. With time and imagination something useful will be created using those items instead of throwing them away as waste. Encourage everyone to think of ways of how to repurpose the items.

Recycle, this is the most efficient eco-friendly venture in waste disposal methods. Cardboards, glasses, plastics and organics should be recycled if possible to reduce the amount of waste generated by the organization. People would be surprised by the amount of waste reduced if they adopt the idea of recycling. For example, the used clothes can be recycled and sold of which is definitely hitting two birds with one stone, no waste and some money in the wallet.

*Fig.4 shows a safe green world when the 5Rs are implemented.*



Landfills should be managed, incineration should be reduced and waste as a whole should be reduced in order to reduce global warming that can greatly impact climate changes.



Case study

Deepwater Horizon Oil Spill, *Wikipedia* (2022) case study, Deepwater Horizon was an ultra-deep water, dynamically positioned, semi-submersible offshore drilling rig owned by Transocean and owned by British Petroleum (BP).On 20th April 2010, while drilling at the Macondo prospect, a blowout erupted that caused an explosion killing 11 me.Two days later the semi-submersible rig sunk but leaving the well gushing at the seabed causing the largest marine oil spill ever.

The spill was over 4.9 million barrels of crude oil with aggravating effects on both the marine life and environment. The spill resulted into petroleum toxicity, oxygen depletion and use of corexit causing more damage in the aftermath of the accident. The worst part is that the spill continued until 15th July 2010 and finally on 19th September 2010, the well was permanently sealed and declared permanently dead.

*Fig.5 shows the Deep Water Horizon rig, explosion and oil spill pollution.*



The Analysis

Basing on the reports and judgment, Judge Carl Barbier ruled that BP was guilty of gross negligence and willful misconduct under the Clean Water Act. Safety documentation and emergency procedure information was absent. Human error was also cited as a contributing factor rather than equipment failure. The spill ultimately turned into waste and the initial clean-up procedures also added more salt to the wound. The eco system was greatly affected and this largely contributes to climate changes when the environment is polluted. From this accident, much was learned about environmental impact from oil spills where by flow rate of spills were developed and quicker methods to test contamination in the marine animals.



Conclusion

Waste management is aimed at reduction of the dangerous effects of waste on the environment and human health. Waste management in developed countries differs from developing countries whereby the approach is totally different but the results should be the same.

To reduce the effects of global warming that lead to climate changes, budgets should be set aside to manage waste because it’s a relatively expensive venture. Laws and policies should be in place and implemented in order to deal with the solid waste created by households, industrial and commercial activities.

Production of single use products should be regulated and minimized, reuse must be advocated for and where not possible recycle should be done in order to preserve the environment. Disposal in landfills should be as per the regulations and incineration only done by recognized companies. In the oil and gas industry plus other factories, flaring should stop or if not possible minimized.

When all is said and done it comes to one solution, teach them young the ways of waste management and the impact of global warming in order to have a healthy future. It’s never too late to save the environment that we live in.Let it be a collective effort and let every individual be responsible for preserving nature

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