

## Committee/Council: Environmental Committee

Issue: Finding long term solutions for waste management in LEDCs

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### Introduction

In the last decades, waste management has been an issue that has concerned environmental experts. They purport that through proper waste management, not only would members of nations be able to live healthier, but air pollution and climate change could be fought as well. That is because, when waste is not treated properly, as for example when it is being burned, it releases toxic gases into the air, which may contain greenhouse gases that are responsible for global warming.

Although MEDCs usually have efficient waste management programs and systems, developing nations struggle to develop sustainable waste management programs. This is due to a number of reasons, such as lack of technical equipment, lack of resources as well as civil lack of awareness of the importance of waste management. Unfortunately, MEDCs burden the waste situation in LEDCs. It has been reported that several MEDCs “dump” their waste in developing nations through cargo ships.<sup>1</sup> This has outraged several experts and thus conventions, such as the Basel Convention, have been created.

That being said, LEDCs have made attempts towards waste management. International organizations as well as a few states, externally support waste management programs either monetarily or through

provision of technical equipment. However, developing nations cease their attempts towards waste management at the end of aforementioned support. The situation is particularly unfortunate in nations such as



Asian boy sitting among Municipal waste dump site which has been also illegally used as an E-waste dump site.

Source: Green Peace, Natalie Behring-Chisholm:

<http://www.computerweekly.com/photostory/2240108563/Photos-Devastating-human-impact-of-toxic-technology-waste/3/Children-exposed-to-toxic-waste-Devastating-human-impact-of-toxic-technology-waste>

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<sup>1</sup> <http://www.computerweekly.com/feature/Action-against-e-waste> & <http://www.basel.int/implementation/legalmatters/banamendment/tabid/1484/default.aspx>

India, where children walk through dump sites in order to get to school and women and minors work informally in dump sites so as to pick out litter to sell it for recycling.

Lastly, as we can understand the issue is of pivotal importance as it is both affecting negatively the lives of civilians and harming our environment.

## **Definition of Key-Terms**

### Waste management

The process of collection, transferring and disposal of waste products such as litter and sewage, through engagement of all necessary procedures and resources. Procedures include transport of waste through garbage vehicles, disposal facilities as well as following of environmental and health codes and guidelines.

### LEDCs

The acronym LEDCs stands for less economically developed countries also known as developing countries. Most LEDCs are relatively poor and are characterized by high death and birth rates, high infant mortality, low literacy percentages as well as low figures of life expectancy.

### Organic waste

A biodegradable form of waste originating from either a plant or an animal. It is frequently decomposed by other organisms over time. Organic waste usually consists of vegetable and fruit debris, paper, bones and human waste. It can be further divided into putrescible, fermentable and non-fermentable organic waste. Putrescible waste refers to waste which decomposes quickly and releases obnoxious odors. It usually originates from food production and consumption. Fermentable waste, similar to putrescible, can decompose quickly but without emission of obnoxious odors. Its origins are crop and market debris. Lastly, non-fermentable waste is able to withstand rapid decomposition.

### Inorganic waste

A form of waste originated from a chemical element or mineral material. Inorganic waste is rarely harmed by the activities of organisms. Examples are sand, dust and glass.

## **Background Information**

### Waste management practices

While there are numerous waste management methods, experts divide them into eight major groups. These forms of waste management are not applicable to all nations since different climate and natural conditions call for different methods. It is important to remember that these practices call for close cooperation of all responsible institutions, as well as adequate technology and resources.



### Landfill

Landfill has been characterized as the most widespread waste disposal practice today. Landfill is both an area as well as a procedure of waste disposal. As a procedure it is basically the burying of

waste in the ground. As an area it is the area where the procedure of landfill occurs. Frequently, before landfill, a process through which obnoxious waste odors are limited takes place. Although it is the most widespread method of waste disposal, due to inadequate space as well as the existence of methane and other landfill gases which can cause contamination issues, landfill is not recommended by experts due to its environmental consequences.

Unfortunately, landfills are not only located beneath the ground in certain areas; they are also located on ground and in oceans, such as the Pacific. For example, one of the largest landfills is located on ground in Nigeria. The landfill in Lagos, Nigeria, handles about 10,000 tons of waste daily as well as a great quantity of electronic-waste.

Men working in the Lagos Landfill in Nigeria.

Source:

<http://www.takepart.com/photos/biggest-landfills/lagos-dump-nigeria>

### Incineration/Combustion

Incineration is also a widespread form of waste disposal. Through incineration, waste is burned at high temperatures. In this way, the waste is transformed into residue such as gases, heat and ash. Furthermore, this practice has brought great advantages. Primarily, through incineration the volume of the waste can be limited by 20 to 30 percent and thus, reduce the space they consume on landfills. Moreover, the elements produced through incineration are afterwards used as products for the generation of electricity, thus making it the greatest waste-to-energy technology. However, the burning of waste produces many greenhouse gases and thus, has a negative effect on pollution and global warming. That being said, incineration is most of the times the cheapest means of waste disposal in nations where there is no available space for land filling, such as Japan.

## Recovery and Recycle

Recovery and recycle is the most environmentally-friendly method of waste disposal and management. Through recovery and recycle, waste can be transformed into re-usable material and products. It is important to understand that recovery and recycling are similar but not the same. Recovery refers to the reservation of appropriate discarded products so as to achieve a profitable next use. Examples of second uses of waste are energy forms such as electricity, fuel or heat as well as other materials. Furthermore, recycling is the procedure through which waste is converted into new and useful material. Both of these methods offer a variety of benefits. Due to the fact that we are able to reuse material, we reduce the consumption of both fresh raw material as well as energy. Moreover, pollution and global warming is reduced. Contradictory to incineration, when recycling occurs, no greenhouse gases are emitted into the atmosphere and thus, if we were to replace incineration with recycling, emission of greenhouse gases could be reduced by a great deal and thus, pollution and global warming could be reduced as well. With the correct provision of resources and technology, recycling would be an effective long-term solution for LEDCs.

## Composting

Composting is the most controversial method of waste management. It refers to the process through which waste is left in a big area for several months so as to naturally bio-degrade by microorganisms. The greatest benefit of composting is that it allows the waste to be reused. Composted waste can be used as fertilizer as well as soil amendment, making it useful for organic farming. However, it requires large amounts of space and is a slow process, a fact that is considered a disadvantage by some. That being said, experts insist that 50% of waste in developing nations could be handled through composting.

## Plasma gasification

Plasma gasification is an alternative waste disposal method, characterized by experts as eco-friendly and cost-effective. In order to understand plasma gasification, one needs to be aware of what plasma is. That being said, plasma is the highest energy form. Plasma is an ionized gas, a gas that frees electrons from their atoms, allowing both ions and electrons to co-exist. A substance if sufficiently heated - about 3,000 degrees F- becomes an ionized gas. Examples of plasma are lightning and fire. With that information in mind, in plasma gasification the waste is converted into syngas (synthesis gas) through the use of ultimate heat inside a gasifier. The gasifier uses plasma torches to maintain extreme heat. Furthermore, through plasma gasification,

waste is transformed into the basic ingredients for chemicals, fertilizers, substitute natural gas and liquid transportation fuels, making it one of the most effective waste management methods since it gives an alternative second-use to waste. A number of developed nations such as the United States of America and the United Kingdom as well as developing nations such as China and India use plasma gasification.

### Waste to energy

Waste to energy is the procedure through which non-recyclable waste products are converted into energy such as useable heat, electricity or fuel. This change can happen through a variety of technological methods. Although it is not cost-effective, the Waste to energy method offers a wide variety of advantages. Specifically, since this method converts waste into energy such as fuel, it can be used as an alternative for fossil fuels, thus eliminating their need and in turn, by limiting their need and use, diminishing carbon emissions. Moreover, it brings an alternative, cheap method to bringing electricity to communities and community buildings. If LEDCs were to apply this form of waste management they would both handle their waste management problem as well as provide electricity for the people of their communities and cities.

### Waste Minimization

This form of management simply calls for the avoidance of creation of waste and thus, the elimination of the amount of waste reaching landfills and other waste management institutions. Examples of waste minimization can be put into effect into the daily lives of civilians. In detail, the repairing of old broken items instead of their replacement, the reuse of products such as jars instead of their disposal, the minimization of buying single-use products, are some examples of daily life waste minimization. That being said, waste minimization is not enough to cover the waste management needs of a community and/or society alone and, as most waste management methods, needs to be incorporated into waste management policies in coordination with other waste management methods. However, it is also essential for the reduction of waste amounts produced in a nation and can bring an eco-friendly environment and mindset amongst civilians.



Picture indicating parts of a gasifier.

Source: <https://www.e-education.psu.edu/egee439/node/607>

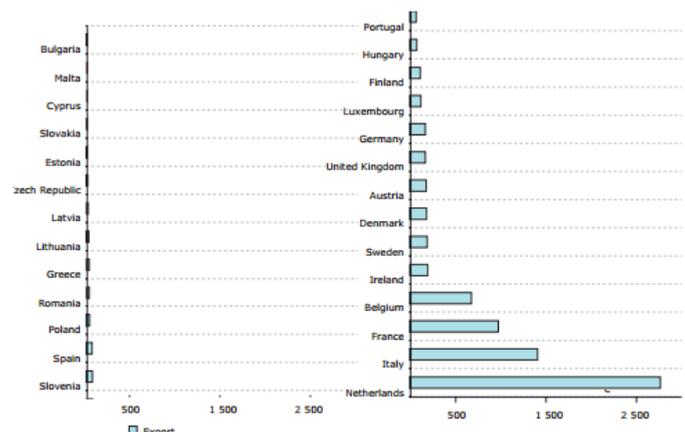
## Major elements which affect waste management in LEDCs

In recent years, new difficulties have arisen in the management of waste. The number of factors making the situation more complex is ever multiplying.

Primarily, urbanization has played a major role in the process of waste management. While infrastructures seem to be strengthening in the past years in LEDCs, communities have not included space for waste management technologies and components. Through this we can understand that long-term solutions for waste management have not been considered in LEDCs. If they had been, part of the resources for infrastructures would be distributed to the establishment of adequate technology. The situation is particularly bad in African LEDCs, in which slums are a common phenomenon. Slums are particularly unfit for waste management, which, according to the UN's Africa Review Report on Waste Management<sup>2</sup>, is one of the factors that strengthen the spread of diseases in slums. The aforementioned highlights the importance of waste management in such regions.

Furthermore, urbanization has also altered the lifestyles of civilians and has resulted to the creation of industrial sites. That being said, more waste is generated due to increased industrial as well as urban activities. In particular, the increase of the use of technology, whether that be industrial or civil (computers, mobile phones etc.) is initiating large amounts of E-waste. Some LEDCs have not yet developed adequate technologies and sites to handle E-waste and thus, dump sites are overflowing and overwhelmed with E-waste. Although urbanization has been unhealthy for the E-waste issue in LEDCs, European Union countries as well as the United States of America have worsened the situation as well. It has been reported

that EU countries, specifically Italy, the Netherlands, France and Belgium, as well as the United States of America, trade in a large part of their E-waste in countries such as China, Pakistan, India, Nigeria and Ghana, thus, exposing workers at dump



Graph showing hazardous waste exported from EU countries to LEDCs in the year 2009 in tons.

Source: European Environment Agency report on "Movements of waste across the EU's internal and external borders"

<sup>2</sup> [http://webcache.googleusercontent.com/search?q=cache:http://www.uncsd2012.org/content/documents/AfricanReviewReport-onWasteManagementSummary.pdf&gws\\_rd=cr&ei=ipJ6V7KNOsHwgAbX-rGYCA](http://webcache.googleusercontent.com/search?q=cache:http://www.uncsd2012.org/content/documents/AfricanReviewReport-onWasteManagementSummary.pdf&gws_rd=cr&ei=ipJ6V7KNOsHwgAbX-rGYCA)

sites to larger amounts of E-waste. Trade-in of E-waste is illegal under the “Waste Electrical and Electronic Equipment Directive”, namely a European Union Directive, as well as other international laws and conventions<sup>3</sup>.

The aforementioned waste trade phenomenon is to further emphasize the gap between policies and their practice. Although some LEDC governments have signed policies and laws on the management of waste, proper equipment hasn't been installed due to lack of government investment and ratification of aforementioned laws and policies. Gap between policies and their practice is highly present in African LEDCs, according to the UN's African Review report on Waste Management.

That being said, it is in our favor to understand the aforementioned elements in order to be able to adequately and effectively resolve the issue on a multifaceted approach.

## Major Countries and Organizations Involved

### India

India's huge waste management problem is ever growing. India generates 0.14 million tons of garbage daily. Although the number might not seem overwhelming, considering the fact that countries like the United States generate 275 million tons daily, waste management in India is so little that the problem has reached the inside of communities. Formally, the basic waste management disposal method is landfill. There is also presence of many dump sites where garbage is stored for years before it is processed, if it is processed at all. The phenomenon is especially present in Mumbai. Mumbai citizens and especially children of poor families work illegally in dump sites, picking and transferring waste so as to sell it for profit. This occupation is called “waste picking” and as an informal occupation, it occupies approximately 300.000 Indians in major cities such as Delhi, Gujarat and Ahmadabad. Moreover, in February 2016, men working in the transportation of waste to dump sites went on a strike for several weeks, causing the overflow of garbage in the cities. In addition, dump sites often catch fire, releasing toxic gases into the air such as methane and according to studies, causing air pollution as well as triggering diseases in the area. Another major waste issue is prominent in lakes and wetlands. Much of the waste is dumped in lakes and wetlands provoking the disturbance of maritime environment and wildlife. As a civil engineer explained to a journalist, wetlands have transformed into a “deep, black stinking river of waste that flows in an open channel”<sup>4</sup>.

India's waste management problem is largely due to the gap between legislation and practice. For example, although legislation obliges residents to segregate waste,

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<sup>3</sup> <http://www.basel.int/Home/tabid/2202/Default.aspx>

<sup>4</sup> <https://www.theguardian.com/environment/2012/aug/01/india-cities-drown-sewage-waste>

meaning the division of waste based on their elements, residents don't even divide their waste between wet and dry waste<sup>5</sup>. Thus, the problem does not only relate to institutions and governmental bodies, but to civilians not being aware of the importance of waste management as well.

## Nigeria

Nigeria is one of the most promising African countries as regards economic development. Its growing population in urban areas has ranked it the 7<sup>th</sup> most promising nation globally. That being said, its growing population worsens the issue of waste management in the nation. In Lagos per se 40 metric tons of waste are produced each day with only about 40% of this waste being collected by official institutions. This is due to inadequate monetary and technological resources for waste management practices as well as lack of civil awareness. Drain and sewage systems are starting to block and wetlands are being littered due to the large, reckless amount of waste produced by civilians. Additionally, in Lagos, not only is waste left in rubbish bins for weeks before being collected, resulting to the overflow of rubbish bins, but collection trucks exceed their capacity and carry 5 to 6 tons of waste in one trip so as to minimize the number of trips. This has brought about the attention of activists who condemn the action and ask for the government to review its legislation and guidelines regarding waste.

That being said, the government is trying to strengthen private sector-led waste management. It is thus making civilians pay a monthly levy in order to collect their waste through signing contracts with private companies. Although that is irresponsible for a government, since it is its duty to do everything in its power to improve waste management, civilians do not complain since rubbish is collected.

## Timeline of Events

Date	Description of event
August, 1986	Khian Sea, an American cargo ship, unloads 18,000 tons of hazardous waste on the coast of Haiti, after being declined disposal of the waste from the Honduras, Panama, Bermuda and others.
1987	Nigerian and Italian businessmen agree on illegal deal, allowing the Italian to store and dump his waste on the Nigerian man's property, marking it as one of the most important cases regarding global waste trade.

<sup>5</sup> "Waste from a house can be broadly divided in to two categories – dry waste and wet waste. Both need to be disposed and recycled differently. Wet waste includes cooked and uncooked food, waste from fruits and flowers, fallen leaves, dust from sweeping and other similar things. On the other hand, paper, plastic, rubber, metals, leather, cloth rags, wire, glass and things etc. fall under the category of dry waste. Remember that wet waste is organic and dry is not." (Source : <http://www.doh-bin.com/Managing-waste.html>)

May, 1992	The Basel Convention on the Control of the Transboundary Movements of Hazardous Waste and their Disposal is put into force by 183 countries, including European Union countries.
2008	South Africa passes Waste Management Act, defining waste and creating a waste management program, marking it as one of the first LEDC initiatives towards waste management.
2012	Haitian government passes waste management law by condemning the import of polystyrene foam and plastic polyethylene bags, marking it as one of the first tries towards waste management in the nation.
2012	“Wecyclers”, a young initiative in Nigeria is found in order to collect and transport garbage found on the streets using cargo bicycles.
February, 2016	Garbage men in India go on strike for several weeks, resulting in the drowning of major cities like Mumbai in litter.

## Relevant UN Treaties, Resolutions and Events

### Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal

The Basel Convention is an international treaty, signed by 53 nations and partied by 184. The Basel Convention was created in order to eliminate the trading of hazardous waste between nations, especially from MEDCs to LEDCs. The treaty gives a clear definition of hazardous waste, examples of it, while encouraging nations to minimize waste generation as well. Furthermore, countries such as Denmark, with the aid of international organizations such as Green Peace, lobbied for the adoption of the Basel Ban Amendment which bans certain developed nations such as France, Italy and the Netherlands, from transferring their waste in LEDCs. However, the amendment did not pass since it needed  $\frac{3}{4}$  of the parties of the Convention to ratify it. All in all, the Basel Convention still remains the strongest weapon against global waste trade in LEDCs.

### Special Program

The United Nations Environment Program, the United Nations’ program responsible for waste management, in its first session in June 2014, put into force the Special Program. The Special Program has the aim of strengthening national and international chemical and waste conventions such as the Basel Convention. Its aims are to be established through strengthening of public institutions in developing nations and economies so as to ensure the implementation of policies and frameworks regarding chemicals and waste. Currently, a Trust Fund for the Special

Program exists which has been enriched by several nations and organizations such as the Finland, Sweden, USA, Germany, Austria, as well as the European Union.

## Previous Attempts to solve the Issue

Many programs have been launched in order for sustainable waste management. However, most waste management programs that were launched were short-lived and lacked co-operation of institutions. That being said, there were still some successful attempts at solving the issue at some LEDCs.

### Argentinean National Urban Solid Waste Management Project

Greatest example of all is the example of Argentina. Argentina launched its “National Urban Solid Waste Management Project”<sup>6</sup> in order to improve conditions in its solid waste management system. Furthermore, it got a loan from the World Bank of 40 million US dollars in order to train its waste management experts, enhance its recycling technologies as well as strengthen its institutions. It has met its terms with the World Bank to a great extent and thus the situation has improved. However, it is controversial whether it will be able to fulfill and repay the debt by the end of the project’s “maturity” phase or not.

Although the Argentinean example proved to be more than successful, most cases do not turn out to be positive. Although the World Bank and other organizations provide external support to LEDCs, developing nations tend to cease their attempt at a sufficient waste management program right after external support finishes. In this way, most solutions are short-term.

Moreover, there have been many attempts to solve the issue of global waste trade which plays a massive role in poor waste management in LEDCs. As a matter of fact, the Basel Convention has its own secretariat for the implementation of the Convention through workshops and meetings with member states of the Convention. However, as is proved by the graph shown above, global waste trade is still present and is burdening developing nations.

Lastly, civil initiatives have helped the situation as well. In Nigeria a group of young adults per se created “Wecyclers”. “Wecyclers” use carbon bicycles in order to collect garbage and rubbish in Nigerian cities to transport it to dump sites and other government institutions. Although their work has not changed the situation dramatically, it can work as a symbol and inspiration towards other members of the society as well as governments in order to enhance their waste management.

## Possible Solutions

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<sup>6</sup> <http://www.worldbank.org/en/news/loans-credits/2006/02/28/argentina-national-urban-solid-waste-management-project>

Due to its nature, the issue requires a multifaceted approach. Primarily, developing nations need to re-create and restructure their waste management policies and programs. Moreover, they will need to reassess the methods of waste disposal. Each nation, due to differences in climate and in natural environment, is suitable for different methods and thus, it will need to find the ideal one.

Additionally, after they reassess their methods, ways and resources will need to be found in order to achieve the strengthening of practices such as transportation of waste, storage etc. All in all, sustainable programs including all aspects of waste management need to be reassessed.

Furthermore, awareness between civilians needs to be raised. It is known that some civilians in LEDCs, for example Nigerian civilians, are reckless as regards their garbage and litter streets and wetlands. Civilians need to understand the importance of waste management both for the environment and for their health.

In addition, technical resources should be enhanced. Waste management technology and equipment is poor, even non-existent, in developing nations. This stands as an obstacle for waste management and thus, nations need to invest in advancing their technology and equipment. MEDCs could also help in the investment for the renewal of waste management technology in LEDCs.

Last but not least, measures should be implemented as regards global waste trade. Developing nations generate millions of tons of waste daily and they are unable to handle the amount of waste. That being said, the situation is only made worse by MEDCs getting rid of their waste in developing nations. Although conventions are already present for the use, nations and organizations need to try harder for their proper implementation through a wide variety of measures.

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