Committee: United Nations Environmental Committee

Issue: Promoting a sustainable waste disposal management system in developing countries

Student Officer: Marina Kontalexi

Position: President

INTRODUCTION

Dear all,

My name is Marina Kontalexi and I will have the honour to serve as the President of the UNEP in Arsakeia- Tositseia Schools MUN 2018. I graduated last year from Arsakeio Tositseio in Ekali and as of October 2018 I will be studying Electrical Engineering in National Technical University of Athens. As I look back to my high school years, MUN is dominant in every one of them, and whether you share my love or not, I assure you this conference will not disappoint you.

As far as our topic is concerned, it is one of the most demanding and urgent issues at the moment. Waste management has been a challenge for mankind since its early beginning, but today's increasing consumption together with the modern technological advancements has altered the amount as well as the composition of waste, thus rendering its disposal a difficult task. Hence, a pseudo dilemma has emerged; is waste a problem or a resource? This study guide wishes to provide you with stimuli concerning several aspects of the topic but by no means should you limit your research to it. Suffice it to say, should any inquiries arise, do not hesitate to contact me via e-mail at kontalexim@gmail.com.

Image 1Plastic, plastic, everywhere: The world's oceans are full of discarded trash that degrades and sinks, or drifts ashore at places like Turneffe Atoll in Belize.

I am looking forward to working with you and getting to know your ideas. Do not be afraid to be revolutionary and do not forget that a competent delegate is always well prepared.

Warm regards,

Marina

DEFINITION OF KEY TERMS

Waste

As defined in the UN Environment Glossary, waste is "materials that are not prime products (that is, products produced for the market) for which the generator has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose. Wastes may be generated during the extraction of raw materials, the processing of raw materials into intermediate and final products, the consumption of final products, and other human activities". Residuals recycled or reused at the place of generation are excluded. Main waste types are biological, solid, industrial, household etc.

Developing country

The list of the developing countries is decided upon by the United Nations Economic and Social Council and, ultimately, by the General Assembly, on the basis of recommendations made by the Committee for Development Policy. The basic criteria for inclusion are related to per capita GNI, a human assets index and an economic vulnerability index.[1]

Landfill

The UN Environment Glossary defines a landfill as the "final placement of waste in or on the land in a controlled or uncontrolled way according to different sanitary, environmental protection and other safety requirements".

Waste disposal

[1] For a glance at the developing countries' list, as proposed by the UN, check the following link: http://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf

According to the UN Environment Glossary waste disposal consists of "waste elimination techniques comprising landfills, containment, underground disposal, dumping at sea and all other disposal methods".

Waste to Energy

Waste to Energy (WTE)[2] is a term that is used to describe various technologies that convert non-recyclable waste into usable forms of energy including heat, fuels and electricity. WTE can occur through a number of processes such as incineration, gasification, pyrolysis, anaerobic digestion, and landfill gas recovery.[3]

Incineration

As defined by the UN Environment Glossary, incineration is "controlled burning of solid, liquid or gaseous waste materials at high temperatures".

Composting

The UN Environment Glossary defines composting as a "process of reducing vegetable and animal refuse, either by natural biological decomposition of organic material in the presence of air or by controlled mechanical methods, for the purpose of increasing and maintaining soil fertility".

Biodegradable

The Cambridge Dictionary defines the term biodegradable as "able to decay naturally and in a way that is not harmful".

[2] This video might prove to be beneficial when trying to understand how a WTE plant works: https://www.youtube.com/watch?v=lmtOuAed5nM

[3] "Waste to Energy." *Biofuels | Student Energy*, www.studentenergy.org/topics/waste-to-energy.

BACKGROUND INFORMATION

The disposal management throughout history

Image 2 Children working as mud larks in Victorian times

Surprisingly or not, it was not late in humanity's history when people started to worry about waste management. As a matter of fact, the Mayas (2000 BC-950 AD) used to gather and incinerate their waste, whilst in ancient Athens waste was discarded at least a mile away from the populated areas. Later on, in medieval times, people started to realize that the way they handled their waste was affecting them indirectly, either through animals (e.g. rats) or by polluting the water supply which resulted in the spread of diseases, such as the Bubonic Plague, cholera and typhoid fever. During the industrial revolution, the world was faced with a significant growth of the production that led to the proportionate amount of waste. At this time, certain professions associated with waste management made their appearance, such as but not limited to "mud larks" and "dustmen". By the time a report linking these diseases to their environmental causes was published (circa 19th century), the "Age of Sanitation" commenced. However, today's concerns about waste disposal cannot be addressed as easily, as there are several issues emerging when it comes to waste management, especially in developing countries, where any initiative is hampered due to poor infrastructure, limited financial -and other- support and rapid urbanization.

The issue today

In 2012, as indicated by the World Bank, the average waste generation per capita in lower income and lower middle income countries was 0.60 and 0.79 kg/capita/day respectively, whereas the average in high income countries is 2.1 kg/capita/day. Many lower income countries are struggling to collect the waste. For instance, Haiti manages to collect 11% of its waste, while the percentages in Uganda, Zambia and Senegal are below 40%. This percentage in OECD countries is close to 100%. The primary disposal methods in each group

are also significant. In developing countries most waste is disposed in dumps and landfills, whilst in developed countries recycling and waste-to-energy techniques are more popular.

Concerning waste treatment technologies, there are many alternatives to the already established methods like landfills, incineration, composting and recycling. To begin with, anaerobic digestion is a process of biodegradable material (waste) being disintegrated by microorganisms, without the presence of oxygen. It can be helpful with waste management and is considered a form of renewable energy because it produces biogas. Anaerobic digestion is currently implemented in certain countries, such as India, South Africa, Mexico and Peru. Another such technology regarded as a renewable energy source (if the original material comes from biomass[4]) is gasification. Through gasification, organic materials are converted into carbon monoxide, hydrogen and carbon dioxide. Gasification is an alternative with low handling costs and can be found in the USA, China, Brazil and others. Furthermore, the process of pyrolysis is "a thermochemical treatment, which can be applied to any organic (carbon-based) product. In this treatment, material is exposed to high temperature, and in the absence of oxygen goes through chemical and physical separation into different molecules"[5]. Pyrolysis plants are currently operating in the USA, China, Japan and others. These are only few of the alternative waste disposal mechanisms. Other examples such as but not limited to biodrying, plasma arc and waste autoclave can also be encountered worldwide. Having taken a glimpse of the waste disposal technologies, the issues emerging either from their usage or from the waste in general need to be addressed.

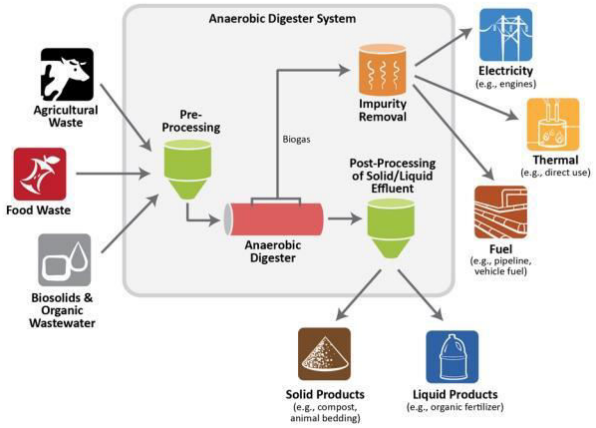

Image 3 Anaerobic digestion process

Overconsumption calling for overproduction

[4] Waste can be a form of biomass.
[5] "What Is Pyrolysis Process?" | *Biogreen*, www.biogreen-energy.com/what-is-pyrolysis/.

First comes the issue of producing too much waste. Taking into consideration that current –real or fabricated- needs have been multiplied as well as the fact that overpopulation befalls many developing countries, consumption has been radically increased. Hence, the production of more goods is consequent which naturally causes the waste volume to augment. In fact, the World Bank's projections on waste generation by 2025 indicate a doubling of the per capita waste mass. In addition to that, modern industries are not focused on reusable products, instead they mainly produce disposable items, which further stresses the issue.

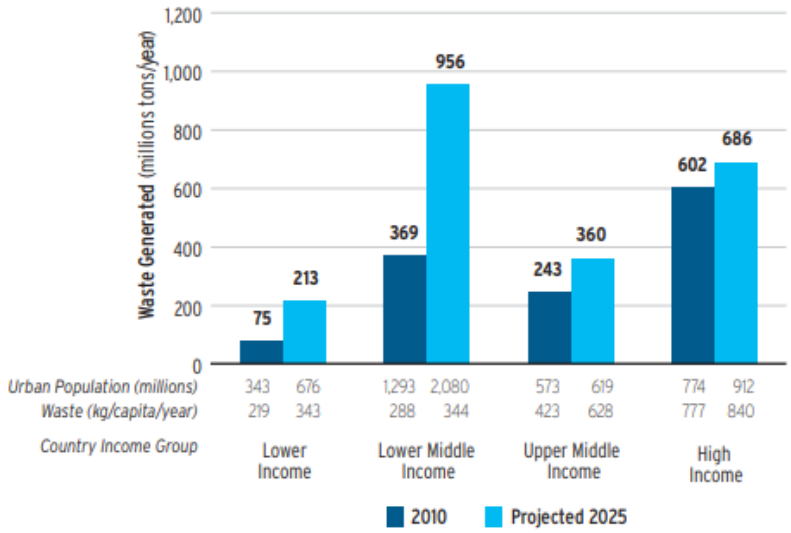

Image 4 Urban Waste Generation by Income Level and Year

Hazardous waste

Image 5 Turtle trapped in a plastic bag

Another valid concern is the dangers brought up by the components of waste. Toxic waste is estimated to be almost 15% of the total waste amount. The toxicity of its chemical composition is a threat to humans (e.g. diseases such as cholera, and groundwater contamination, which impairs its drinking and agricultural usage), to animals (as most packaging material is not biodegradable and can be fatal for them), as well as to the environment as a whole (as it can destruct several natural resources and worsen global warming). A primary source of such waste is nuclear energy stations, which can be found in many developing countries, such as India, China, Brazil and others.

Image 6 Nuclear waste tainted with trinium dumped into the Pacific Ocean

Landfills, Incinerators and Composting

Globally speaking, most waste ends up in landfills. Except for the fact that landfills and dumps are very space-consuming and yet are rapidly getting filled up, waste disposed in such places releases methane (CH_4), a gas chemical compound that is associated with the greenhouse effect. Moreover, waste accumulation in landfills contributes to groundwater pollution. Needless to say, landfills have proven to be risky for the people working in them, as the number of accidents occurring in such places is not negligible, especially in developing countries.

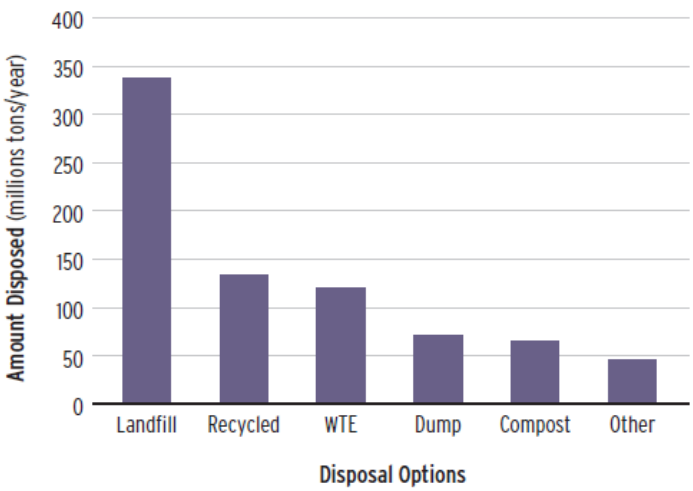

Image 7 Worldwide waste disposal methods

When it comes to incineration, environmental issues still seem to be brought up. In fact, when plastic is burnt it releases toxic substances, such as dioxins, lead and mercury, which are dangerous to humans and the environment. In addition, air pollution control equipment is not advanced in many countries. However, incineration is –fortunately or not- not one of the primary waste disposal mechanisms used in countries of middle and lower income.

Composing also brings up certain health issues. Firstly, the spillage of material is a common phenomenon, which puts the well-being of the people working in such sites in danger, as they can be infected with dermatitis and other illnesses. Not to mention, these

people are regularly exposed to bioaerosols and large numbers of air-borne micro-organisms, which could cause asthma and bronchitis.

Green-ish Alternatives

Whereas mechanisms such as recycling (plasma arc, gasification, pyrolysis) and waste-to-energy are believed to be eco-friendly, in reality they are not 100% green. Burning waste, even though it does not call for the use of fossil fuels, still produces toxic gases which harm the atmosphere. Of course, their impact on the environment is far less than the one traditional methods, such as landfills, have, but their amelioration and modernization should not be neglected.

MAJOR COUNTRIES AND ORGANISATIONS INVOLVED

China

China's waste generation has been radically increasing in the last decade and is considered one of the major polluters worldwide. The country used to import garbage from other countries, mainly from the USA, the UK, Japan and many EU countries, and it was estimated that half of the global waste was located in China, but this practice was banned on January 2018. Although the ban was very encouraged by environmentalists, the exporting countries seem dissatisfied and have been pushing China to lift its ban.

India

India is faced with an acute waste crisis at the moment. It is one of the major plastic waste and e-waste producers worldwide, while most of its garbage is left untreated in dumps and landfills. Recently, India received a proposal from Japan, which offered to help India manage its waste, as Japan successfully converts almost 75% of its waste to energy, through WTE plants.

Sweden

About 50% of Sweden's waste is managed in WTE units. What is more interesting, is the fact that Sweden imports waste from other European countries and uses it as a fuel to fulfil its energy needs.

Germany

Germany's waste management policies have been radically changed. Whereas in the 1950s, there were 50.000 garbage dumps located in Germany. Today, they have been converted into incinerators, biological and mechanical waste processing factories and compost producing units from organic waste. Germany is one of the countries with the lowest percentage of waste disposed in landfills and is a country where many recycling enterprises are based in.

Unites States of America (USA)

The USA is one of the largest waste producers globally. Most of its waste is landfilled, but the number of operating landfills keeps decreasing in the past 50 years. The percentage of waste that contributes to energy generation is not significantly high and WTE plants and combustion facilities are not very common. In fact, as the USA does not face any space limitation, landfills are an easier option and of course a much cheaper one. It should be noted that President Trump removed the USA from the countries signing the Paris Agreement in 2017, keeping a rather indifferent position concerning global warming and other environmental issues.

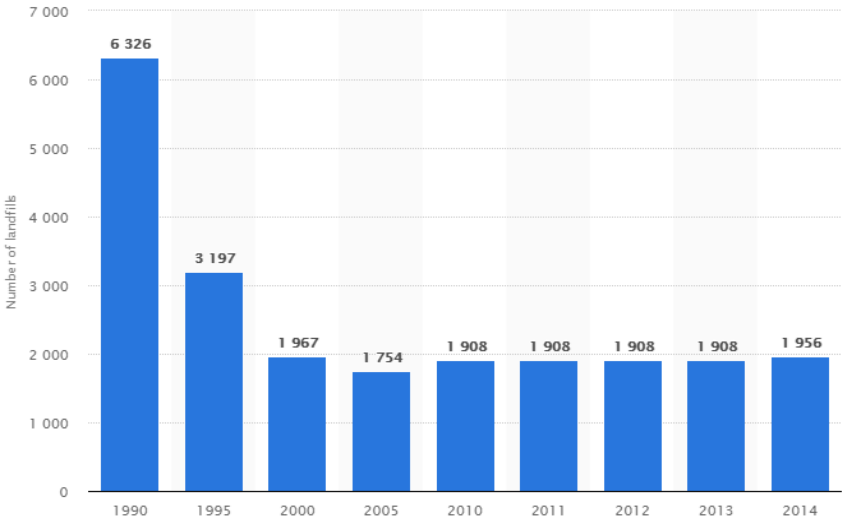

Image 8 Number of landfills in the United States of America

World Bank

World Bank is playing an important role concerning the issue, as it has made significant progress with documenting the situation of garbage management worldwide. Moreover, it has conducted a few programmes to ameliorate the living conditions (in which waste management is included) in several cities in the globe.

TIMELINE OF EVENTS

Date	Description of Event
1031	Japan is the first to reuse waste paper
19TH century	"Age of Sanitation" begins in Europe
1848	After the Public Health Act was enacted in the UK, the dustbin was introduced
1874	The first incinerator is built in England
1960s	Safety guidelines in landfills are proposed
1970	First time Earth Day was celebrated
1981	Managing hazardous waste is declared one of the three priority areas in an environmental program organized by the UNEP
2015	Paris Agreement is signed
2015	A WTE plant is built in the USA for the first time in 20 years
2017	USA ceases participation in Paris Agreement under the presidency of Donald Trump
2018	Africa's first WTE plant starts operating in Ethiopia

UN INVOLVEMENT: RELEVANT RESOLUTIONS, TREATIES AND EVENTS

- The Basel Convention

After discovering that toxic waste was being disposed in areas in developing countries, negotiations for the aforementioned convention started (1988). Its ban amendment is also particularly interesting.

- Prohibition of the dumping of radioactive wastes – A/RES/68/53
- Mandate of the Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes – A/HRC/RES/36/15

PREVIOUS ATTEMPTS TO SOLVE THE ISSUE

Except for the aforementioned resolutions, several creative ideas have been applied globally so as to combat the issue. The case of Indonesia is an interesting one. In fact, as the waste collection was not very successful, a medical Clinique was founded by an individual, which traded garbage for medical services, thus improving the waste collection. Another project worth mentioning is the creation of a very unique amusement park in Uganda. A group of artists had the idea to reuse some discarded materials in order to build the park. In addition to these, a former landfill in Hong Kong was transformed to an eco-park, full with renewable energy plants and was fueled with energy generated from waste.

Image 9 Amusement park made of discarted materials in Uganda

What is of great importance -but usually gets neglected- are the efforts of certain bodies to monitor the situation of waste management and its potential usage in developing regions. For example, the European Commission Joint Research Centre (JRC) has concluded that burning waste could be the way to fulfill about 20% of the energy needs in the African continent. Such a finding can be very helpful in setting specific and achievable goals whose success is certain.

Lastly, the OECD has played a great role in combating environmental issues like the one at hand. After three workshops, the OECD adopted the Recommendation on the

Environmentally Sound Management of Waste, in 2004, which aims at guiding both countries in and out the OECD so that they can form a sustainable waste disposal system.

POSSIBLE SOLUTIONS

Having briefly analyzed the main issues surrounding waste management as well as the policies and alternatives several countries have already proposed, it is high time some basic solutions were presented. What comes first when it comes to any problem -be it an urgent one or not- is raising public awareness. It would be greatly beneficial if the general public had a decent view -free of alarmism- of the matter, as it would be able to actively fight for its solution.

Furthermore, research upon alternative ways for waste disposal should be encouraged. As previously stated, no green alternative is perfect yet, so by intensifying the efforts to perfect it, either in the developing or in the developed world, the benefits are going to be important for both of them. Of course, in order to combat the issue in developing countries, it is of significance that they are provided with the appropriate know-how as well as with funds to support the infrastructure needed for the already proposed alternatives. However, the UNEP has no authority to call for specific funding. What should be underlined is that the proposed for the developing countries methods should involve a minimum mechanical contribution, as the infrastructure is very expensive. Also, as the former WHO employee Hisashi Ogawa confirms, allocating certain tasks, such as waste composting, to households can prove to be a great idea in LEDCs.

What is more, the management of hazardous waste must also be addressed. The importance of the elimination of toxic waste is evidently not debatable, but until this is achieved, measures to safely dispose such waste need to be found and applied globally.

Last but not least, recommending the establishment of new bodies that are to handle specific parts of the waste disposal plan proposed can be a nice idea. Though, is should not be forgotten that creating new bodies can enhance the already existent and irritating bureaucracy, so it would be better to adjust the emerging needs to the duties certain organs, such as the UNEP, already have.

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Graphs, Charts and Photos

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