COMMITTEE GUIDE

UNEP

United Nations Environmental Programme

María José Medina & Emma Restrepo

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Contents:

1. Presidents' Letter

Dear Delegates,

Firstly, we would like to welcome you to the United Nations Environmental Programme's committee in CCBMUN XIX. Our names are María José Medina and Emma Restrepo, and we are 10th grade students from the Colegio Colombo Británico. We are honoured to be your presidents for this model, and hope to be able to provide you with the necessary tools should you need any assistance throughout this process. The MUN is a great learning experience, and we hope to be able to guide you through it successfully.

Since both of us have been delegates in different committees in the past, we are well aware of the responsibility and dedication required to take part in the CCBMUN. As our delegates, we expect you to have distinguished research and preparation skills, as well as a passion for the model. Critical thinking skills will be used throughout the model and can be applied to find viable solutions to different current-world problems. The UNEP committee is very important as it tackles the environmental issues of the world. These problems, such as the topics chosen for this committee's model, usually also have socio-economic impacts that affect the world at an international level.

Finally, as Maya Angelou once said, "You can't use up creativity. The more you use, the more you have." So we expect you to approach your country's position and plausible solutions in an informed yet creative manner. Remember, we are looking for good critical thinking and oral skills, so don't be afraid to test your own limits. In any case, if you have any questions or doubts don't hesitate to contact us at the following email: unep@ccbcali.edu.co.

Good Luck!

Emma Restrepo & María José Medina
UNEP Presidents

2. Committee Information

I. History

The United Nations Environmental Programme, UNEP for short, was established on June 5, 1972, in Nairobi, Kenya. It is an organization of the United Nations (UN) that was created with the purpose of guiding and organizing all environmental activities within its system. They strive to promote international cooperation on environmental issues, providing guidance to UN organizations and encouraging the international scientific community within the UN to participate in the formulation of policies for different environmental projects.

It was established as a result of the 1972 Stockholm Conference on Human Environment. Ever since, this UN committee has encouraged socioeconomic international growth compatible with the protection of the environment. The United Nations Environmental Programme is considered highly important, as it is the only UN committee that focuses on the preservation of our planet, above any human issues. It promotes the sustainable use of natural resources in order to improve the quality of life of populations around the globe.

II. Structure

Based in Nairobi, Kenya, the United Nations Environment Program is organized in a type of hierarchy that branches into different investigating and decision-taking subdivisions, executive places, and regional offices. These subdivisions are in place to ensure that the solutions and actions proposed by the organization will not gravely affect the involved country in matters of development, economy and sustainability.

The Senior Management Team is led by the Executive Director, who is in charge of all of UNEP's administration and secretariat, and accountable to the Secretary-General. Then follows the Deputy Executive Director who is in charge of supervising UNEP's mandates, and who works under the Executive director. There is also a Chief of Staff and various regional managers.

Regional Presence

As stated before, UNEP has regional offices on every continent to evaluate the different situations and issues present in each of them. The offices are: Africa Office; Asia and the Pacific Office; Europe Office; Latin America and the Caribbean Office; North America Office; and West Asia Office.

III. Special Procedures

There are no special procedures in UNEP.

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3. Simulation: *The protection of coral reefs from exploitation by oil extraction companies*

I. History/Context

Location and living conditions of corals

Corals are a relatively delicate species that depend on a symbiotic relationship of the animal with a specific type of algae that lives within it (zooxanthellae). These algae aid in the production of oxygen, disposal of waste, and as a source of nutrients, while the coral offers a safe environment and compounds needed for photosynthesis for the algae. In the case of zooxanthellae, they are responsible for how the coral expands and retains its structure, as various of their byproducts from photosynthesis are key for the coral to obtain carbohydrates, proteins, and most importantly calcium carbonate, the chemical compound that makes up their exoskeleton. Unfortunately, the conditions needed for these organisms to live require tropical temperatures of 20º- 32º C, depths of not more than 50 metres below sea level, and clean saltwater. All of these are becoming increasingly scarce due to the rise of temperatures and contaminants.

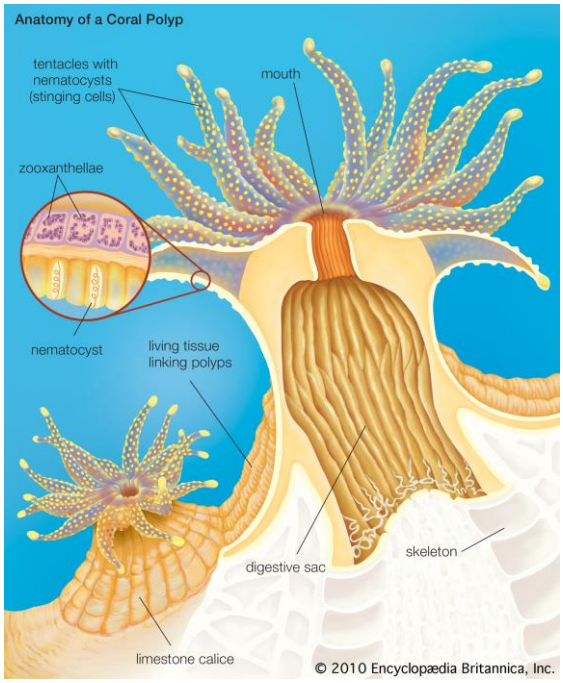


Image: Encyclopedia Britannica Inc. (2010)

The death of a coral is denominated as “Coral bleaching” where normally the algae, the coral or both die. Their hypersensitivity towards a change in minerals in the water and sediments blocking sunlight makes them extremely susceptible to die.

Worldwide there are 110,000 square miles of coral reefs, covering over 100 different countries' coasts[1]. The main reefs are located principally in the Caribbean sea, Pacific Ocean, and Indian Ocean. In the image below the golden areas indicate where coral reefs are located.

Image: Coral Reef Alliance Org. (N/A)

The importance of this type of marine ecosystem is the role it plays for both the benefit of the environment and for human development. Their role can be summarized in three points: economic reliance; coastline protection; and being the habitat of a myriad of different organisms. "Approximately 850 million people live within 100 kilometres of reefs and more than 275 million reside within 30 kilometres, many of whom are likely to be highly dependent on coral reefs, especially those who look to these marine ecosystems for food and livelihoods" (Burke et al., 2011)[2]. In short, millions of people depend on coral reefs as a source of food and employment, for example, for small scale fishing, tourism, and science oriented jobs. In the United States alone, they represent a value of $3.4 billion US dollars.

According to the National Oceanic and Atmospheric Administration (NOAA), reefs support the highest density of species per area, including about 4,000 species of fish, 800 species of hard corals and hundreds of other species, some of which may even be unidentified. The natural resistance and extensive structure of reefs help shield against strong wave currents and tidal rises, and have saved up to $94 million US dollars from possible flood damage every year in

[1] https://coral.org/coral-reefs-101/coral-reef-ecology/geography/ Where are coral reefs located, paragraph 1, line 1-6.

[2] Burke L., Reytar K., Spalding M., Perry A.
Reefs at Risk Revisited
World Resources Institute, Washington, D.C. (2011), 10.1016/0022-0981(79)90136-9
Google Scholar

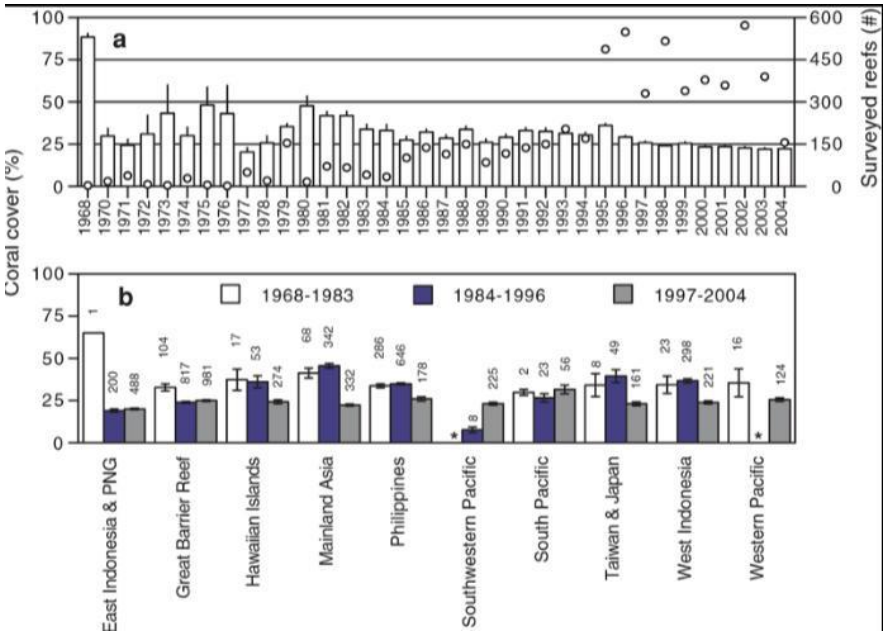
the US. It is worth noting that most countries in the South Pacific and Caribbean would struggle in the scenario of massive coral loss, as their shorelines depend on the reefs.

Image: Australis Cape Horn and Patagonia (2019)

Historical coral decline and relation to offshore oil rigs growth

Since the early 1980's human activities in natural marine environments have increased due to the rise in demand for natural resources found in these areas. A study done by the Department of Natural Science of North Carolina found that, in the last 30 years, approximately 50% of potential reef building corals have disappeared worldwide.[3] In the Caribbean, this statistic is of 80% coral loss over the last three decades, while in the Indo-Pacific region decline is of 50% est. 2019. In the image below, the study's data over the years is shown.

[3] https://www.sciencedirect.com/science/article/pii/S2352485518306637#b19 Point 3, paragraph 1, lines 11-14.(2019)



Simultaneously, the demand for natural oil and gas has increased, leading to the implementation of offshore drilling sites by multinational companies especially in North America, Latin America, and the Middle East (Royal Dutch Shell, Exxon, Chevron, etc). In the following chart, the number of offshore oil rigs in the world and their fluctuations this year are shown. (The data is from July 2, 2021). Take into consideration that there is a significantly large portion of countries that depend on these types of natural resources to receive a steady income.

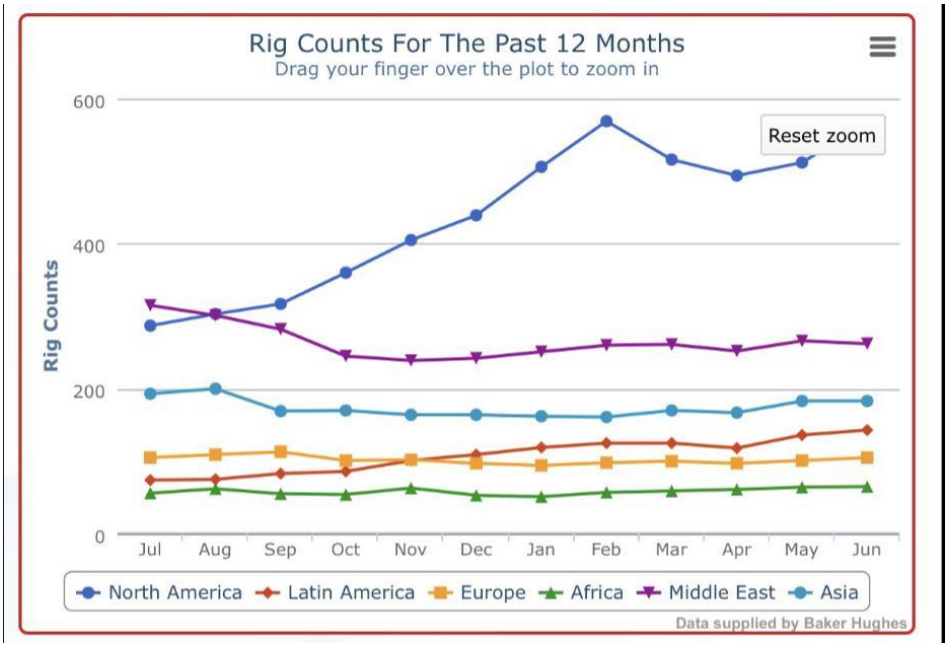


Image 1 & 2: Baker Hughes inc. 2021

In places such as the Gulf of Mexico, the organization and territorial distribution of these rigs is detrimental, often being built over or dangerously close to unprotected coral reefs or other types of delicate marine ecosystems. As stated before, corals are hypersensitive to changes in their environment, and toxic substances such as oil promote bleaching over large portions of sea ground. For example, the spill of 2 million gallons of oil in the Caribbean coast of Panama in 1986 led to the direct and indirect death of 95% of the native coral reef ecosystems in the perimeter surrounding the incident. Everything surrounding the topic of oil rigs is poorly managed and has little to no consequence regarding safety and environmental impact. Things like cleaning methods, jurisdiction, and crisis management, are commonly ignored.

Special Economic Zones

The exact definition of this term is used to define a specific zone within the territory of a country that is subject to different, much less strict, economic regulations normally coming as tax leverages and incentives. These are created as an incentive for rapid economic and technological growth in the area, and are also prone to attract outside investments. Historically, they started being implemented in the 1950s in developed countries, and in the 1970s in Latin America and the Middle East, but in modern-day conditions, there are 4,800 SEZs.

Though these areas have proven useful in ways of development, they present considerable challenges including: increment in bureaucracy; investors being given unsustainable advantages (employment rates, lowering export earnings, etc); conflict of interest (between the multinationals themselves or with other foreign countries); prone to exploitation of natural resources; and the tendency to end in excessive protectionism.

"SEZs will need to pursue business activities in a more socially and environmentally responsible manner that advances the Sustainable Development Goals (SDGs). These challenges call for a modernization of special economic zones." *Joachim Karl, Special Economic Zones: Challenges and Opportunities, N/A, line 5-7 paragraph 3.*

II. Current Situation

Coral reefs are currently among the most important ecosystems on our planet. Their importance is due to their complexity, diversity and economic value. They home approximately 25% of marine wildlife and are considered the 'rainforests of the sea'. Coral reefs provide billions of dollars a year in environmental and economic services such as food, coastal protection, habitat provision, touristic value, and economic dependence. According to the National Oceanic and Atmospheric Administration (NOAA), approximately 500 million people depend on coral reefs for their livelihood, and about 30 million are completely dependent upon them. They protect coastlines from storms and erosion; provide spawning and nursery grounds for economically convenient species; provide jobs and income to locals from fishing, tourism, and recreation; and they are attractions of marine biodiversity.

Image: King Abdula University of Science and Technology (2019)

Coral reefs play an important role in economies all over the world. According to the NOAA, reefs provide economic services and merchandise worth approximately $375 billion in USD per year. Marine organisms that live within these corals are a significant food source for millions of people worldwide. "The National Oceanic & Atmospheric Administration's National Marine Fisheries Service estimates the annual commercial value of U.S. fisheries

from coral reefs to be over $100 million dollars." (NOAA, n.d). Coral reefs are highly important to economies worldwide. More than 94 countries depend on them for touristic means and in 23 of them, coral reef-related economic activities contribute more than 15% to the annual GDP (Gross Domestic Product).

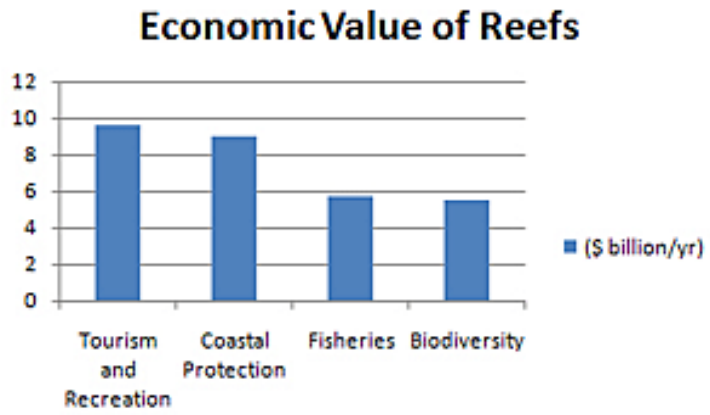


Image: Reef Resilience Network (2021)

Among the many threats coral reefs face today, one of the most important, and our main focus, is offshore drilling, oil spills and their toxicity towards coral reefs. Offshore drilling is the process of extracting petroleum from reserves located in the seabeds under the oceans, instead of extracting from reserves on the mainland. For this, offshore drilling rigs have developed over the years and are now giant structures that can house thousands of people. These platforms sit on towers that can go beneath the water to depths sometimes farther than 1220 metres. Offshore drilling has increased over the past years, and as the demand for oil has grown, so have crude oil prices. According to a report by the Energy Information Administration (EIA), the consumption of global petroleum and other liquid fuels is to grow by 5.3 million b/d in 2021. The EIA estimates that by 2022, the global consumption of crude oil will be 101.81 million barrels per day- making the annual worldwide consumption of crude oil and liquid fuel over 37 billion barrels.

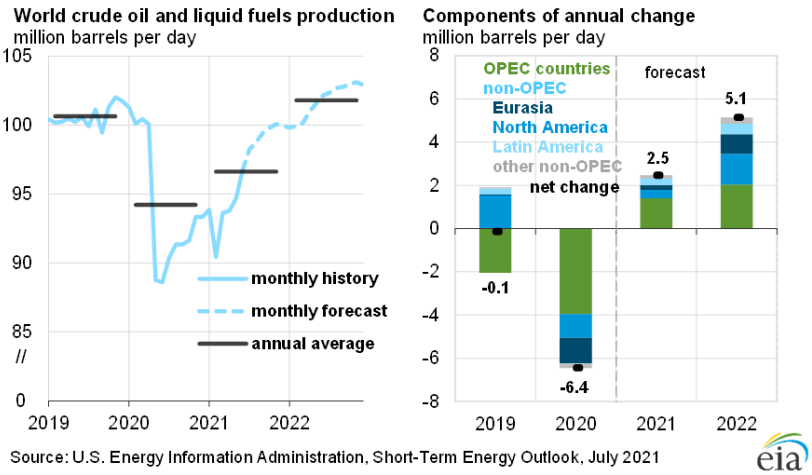


Image: EIA (2021)

For oil extraction companies to meet these high demands for fossil fuels, and when resources become scarce, petroleum companies turn to offshore drilling. Since the world's oceans cover 71% of the earth's surface, great quantities of oil reserves are found in the ground beneath the water. The extraction process of offshore drilling is long and tedious and could take months. This process may have faults and oil could leak into the ocean, harming and possibly killing any form of wildlife and marine organisms within range. Once the reserves are drilled and the liquid is pumped back towards the surface, it is a mix of crude oil, sediments, natural gas, and water. Sometimes refinement facilities are found aboard the rigs, and although most are found onshore, some companies use oil tankers to treat and store oil at sea. This could be a hazard towards marine organisms such as reefs and life within them as leaks can occur. A substitute method to transport crude oil to the mainland is utilizing underwater pipelines. These go from the rigs to the shore in trenches on the seabed, and, although not heard of as much, often leak. In the U.S alone, over 1650 individual leaks from pipelines have occurred since 2010, leaking more than 11.5 million gallons of oil into the ocean.

Image: Energy education (2016)

Oil Spills

When a reef is exposed to oil, which is a complex mixture of many chemicals, many of the corals suffer substantial damage, even if the exposure isn't direct. Oil toxicity can disrupt coral reproduction, development, behaviour, and growth. Although oil spills have decreased over the past few decades, offshore drilling-related spills take place on a consistent basis. Worldwide, there have been approximately 725 spills between 2001-2015, resulting in 207.4

million gallons of oil tarnishing life in our ocean. Records estimate that 880,000 gallons of oil are spilled every year from North-American offshore drilling platforms during normal operations. These statistics are taken without considering external threats such as natural disasters. When Hurricane Katrina hit the Gulf of Mexico in 2005, over 100 rigs were destroyed, spilling over 8 million gallons of crude oil into the Gulf. The effects oil can have on oceans was demonstrated by the 2010 Deepwater Horizon disaster, which released approximately 200 million gallons of oil into the ocean, irreparably damaging entire ecosystems and devastating coastal economies. Oil spills take long periods of time to clean up, and nearly five years after the Deepwater Horizon disaster, a study estimated that 6-10 million gallons of oil remained submerged at the bottom of the Gulf.

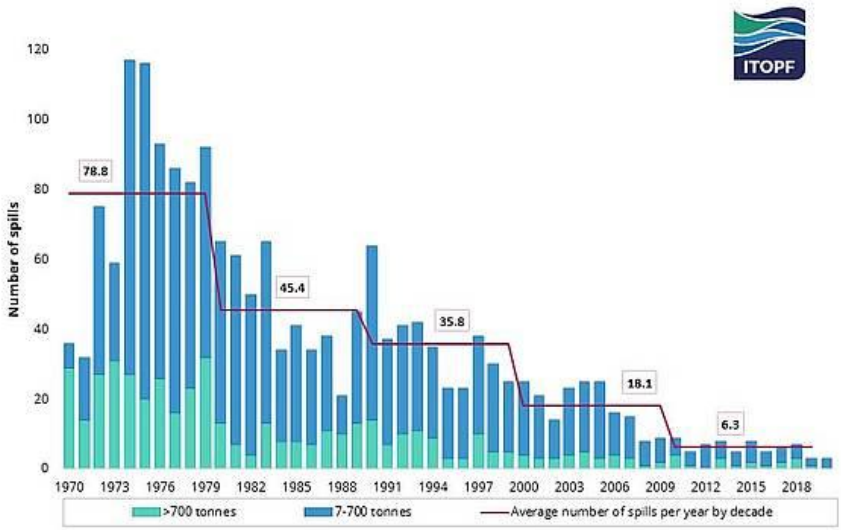


Image: ITOPF, (2020)

Oil spills are one of the reasons for the death of corals and the decrease in this valuable ecosystem. Offshore drilling is very harmful to the environment because of the risks it has. The possibility of leakage or any other problem regarding this industry results in crude oil being released into our coastlines and harming marine ecosystems and wildlife. Recently, on July 25, 2020, a cargo ship struck a reef on the southeast coast of Mauritius, leaking over 1000 tonnes of oil into the coastline. This oil spill not only threatened wildlife, but also devastated the local economy. The oil spill affected waters and reefs that account for approximately 36% of Mauritius GDP and generate $4.3 billion US dollars annually.

Image: Climate Home News (2020)

III. Key Points of the Debate

- Location and jurisdiction of offshore oil rigs.
- Human dependence on corals, how every delegation benefits from this ecosystem.
- Biodiversity and ecological value of coral reefs.
- How oil spills and major disasters that are linked to oil rigs are treated.
- Exports and imports of crude oil and gas.
- Link between Special Economic Zones and multinationals (Modernizing Special Economic Zones)

IV. Participating Organisms

- The Coral Reef Unit (CRU)
- The National Oceanic and Atmospheric Administration (NOAA)
- United Nations Environmental Programme (UNEP)

V. Guiding Questions

1. Does your country have any partnership or agreement with an oil or natural gas multinational?
2. What are your country's gas, oil, and petroleum exports and imports?

3. Does your country limit or restrict the extraction of resources from their special economic zones by international companies?
4. Does your country have any coral reef reserves? If so, does it protect them? How?
5. Is there control or regulation regarding oil rigs in your country?
6. Does your country have any environmental policies about the place of origin of the oil that is sold in the country?

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4. Topic 1: *Evaluating energy production as solid waste management in densely populated countries*

I. History/Context

Densely populated and developing countries face many challenges, and waste management is becoming one of the most important. This is one of the major issues in these countries as it encompasses a variety of problems such as health risks, ecological, economical, and sustainability issues, among others. Municipal Solid Waste (MSW) is the term used to refer to items and materials that are no longer of use and are discarded. Humans produce great quantities of solid waste every day and these numbers are only increasing. According to the United States' Environmental Protection Agency (EPA), the total production of MSW in 2018 in the US was of 292.4 million tonnes. There are many different ways to dispose of this waste, the most common technique of waste management countries utilize is open dumping and burning. These techniques, although most efficient, are also the most harmful towards both the environment and population's health.

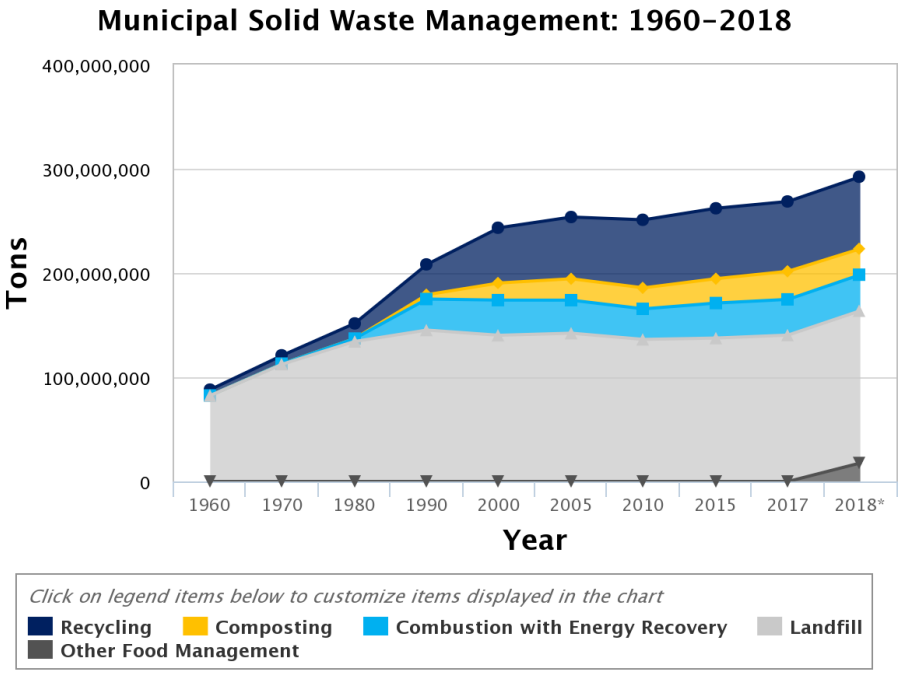

Image: United States Environmental Protection Agency, (2021)

The EPA's records show that in 2018, more than 146 million tonnes of solid waste were landfilled in the US. Over the years, different types of managing waste have surfaced that are more sustainable for both the environment and the people. Some waste management alternatives are recycling, composting, and combustion with energy recovery. As can be seen in the graph above, recycling and composting solid waste have increased over the years as they have been found to be much more sustainable. This process of recycling consists of reusing certain materials for other purposes. However, the EPA calculates that only approximately 32.1% of all solid waste is recycled and composted, leaving over 67% to be disposed of in other manners.

Energy recovery from solid waste is the process of utilizing non-recyclable MSW materials into electricity, usable heat or fuel. For this to occur, the waste must undergo a process known as WTE (waste-to-energy), which includes combustion, gasification, pyrolization, anaerobic digestion, and landfill gas (LFG) recovery. Converting solid waste into electricity and heat not only creates a renewable energy source, but also reduces carbon emissions as it offsets the need for energy from fossil fuels and reduces methane, which is generated by landfills. In 2018, recycling, composting and energy recovery saved over 193 million metric tons of carbon dioxide, which is equivalent to eliminating the carbon emissions from 42 million cars in a year.

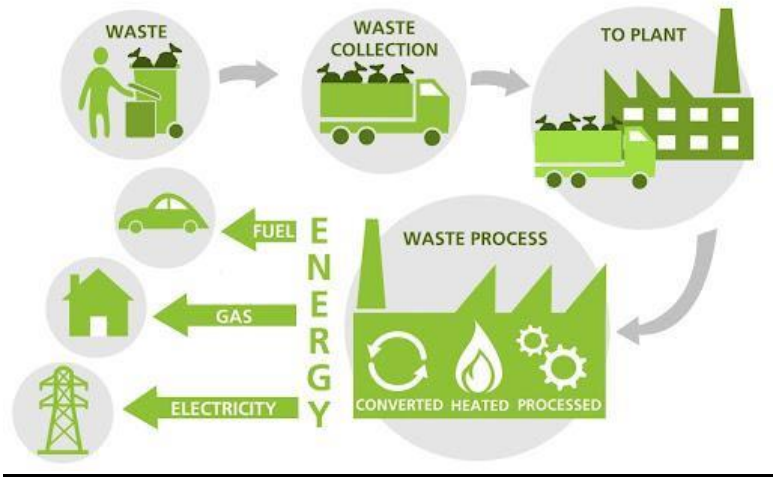

Image: Mergrom, (2021)

Solid Waste Management in densely populated countries

Although many alternatives to solid waste management have been developed over the years and we have become more sustainable, the most utilized manner of managing solid waste is open dumping and landfill. It is estimated that 37% of solid waste is disposed of in some form of landfill, of which only 8% is disposed of in sanitary and controlled landfills with LFG collection systems. According to the World Bank, approximately 31% of global waste is disposed of by open dumping. Approximately 93% of waste is dumped in low-income and densely populated countries.

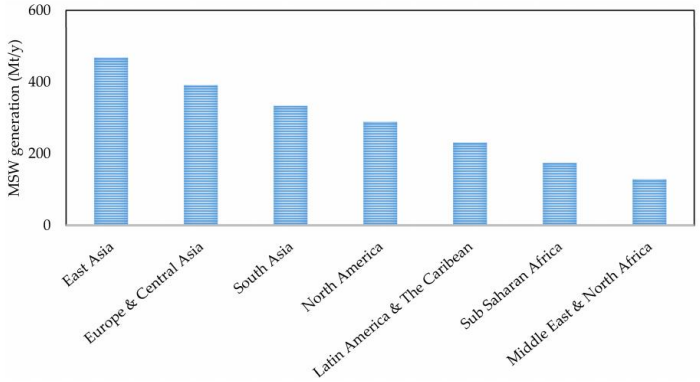

Figure 1. Worldwide annual regional waste generation according to World Bank, 2018.

Image: World Bank, (2018)

Municipal Solid Waste is one of the most crucial challenges that developing and densely populated countries face, as they produce more waste than others. This is usually a problem for developing countries as well, as MSW management requires lots of expenditure. MSW generation increases as the population rises and urbanization occurs. This makes the issue more challenging, as it requires more land to dispose of the waste. A rapid increase in MSW can cause health risks and environmental pollution. MSW management not only affects the environment of a country, but also touches economic and legal matters. In countries such as Bangladesh, most of the MSW is dumped in open fields, which causes environmental pollution and ecological imbalance. This country's urban population is estimated to increase approximately 6% every year, causing the generation of MSW to increase as well. Studies show that approximately 60% of the MSW generated in Bangladesh is not disposed of in dump sites, but done locally, due to poor management practices. This not only causes an immense health risk towards the local population, but also affects ecological and economic issues.

<u>MSW generation</u>

Municipal solid waste generation has increased drastically over the past decades, with 88.1 million tonnes of waste in 1960, to 292.4 million tonnes in 2018. With population growth comes more waste, and different types of solid waste management. As these numbers continue to increase, it can be seen that this pace is not sustainable, and densely populated countries face even more threats as their waste production is much larger.

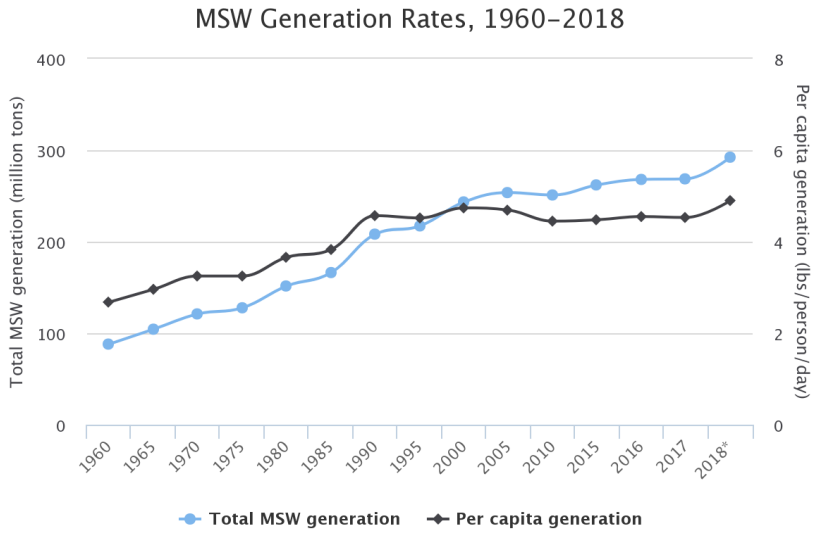

Image: United States Environmental Protection Agency, (2018)

II. Current Situation

Growth in renewable energy usage and relationship with e-waste dumps

The debate about renewable and non-renewable energy sources is always centered on the advantages in the short term for both sides alike. While opting for “greener” options may seem to be better, the impact of the waste that these greener energy-producing facilities create is often not considered. Take as an example broken, damaged, or no longer functional solar panels. They are built based on silicone and electronic parts and circuits, that when disposed of end up in what is referred to as an e-waste dump in developing countries. Although not all the waste found in these dumps is from renewable energy facilities, 250

thousand tonnes of solar panel waste was produced in 2018 alone[4], and the demand for renewable energy has increased by 50% every year since 2012.

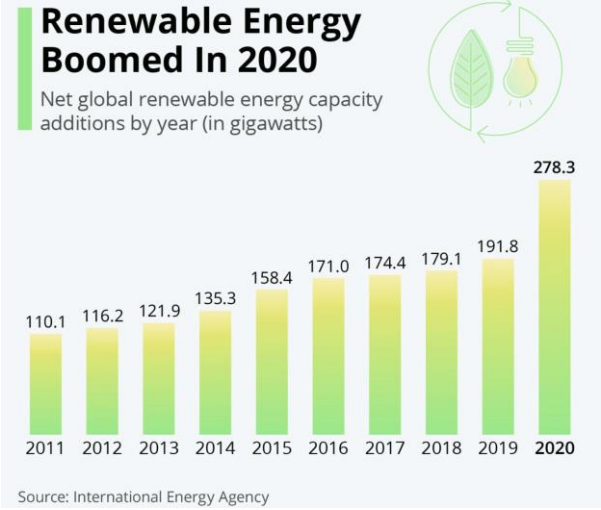

Image: Statista, (2021)

Additionally, the already growing production of organic and inorganic waste by every household has to be taken into consideration. For example, in Europe prospering and growing economies allow each civilian to afford more products, including more technology, and their need to update it amounts to waste. The amount of waste, referred to as municipal solid waste (MSW), produced by 512 million European citizens in 2015 was about 477 kg each, which was enough to cover the island of Malta (316 km square) in a 2 cm thick layer of waste[5]. Since then the statistics have likely doubled. Additionally, the rest of the world produces 2.01 billion tons of municipal solid waste annually, most of it coming from high income countries, which only represent 16% of the world's population.

[4] https://www.renewableenergymagazine.com/emily-folk/waste-in-the-renewable-energy-industry-and-20200305 Waste in the Renewable energy Industry, (2020), Emily Folk, paragraph 6, line 2.

[5] https://www.sciencedirect.com/science/article/pii/S0360544217319862 Municipal Solid Waste Management, 2017, various authors, Introduction paragraph 1, lines 10-17.

Projected waste generation, by region (millions of tonnes/year)

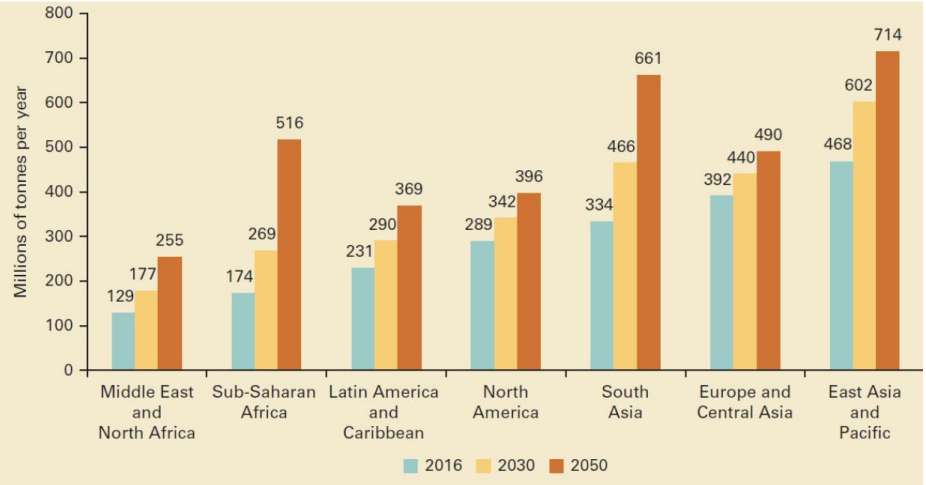

Image: The World Bank Data, (2021)

Each country's management of waste

There are different systems of collection, distribution, and final placement. This may be through recycling and compost, or through uncontrolled dumping and landfills. These systems are undeniably efficient where they are properly funded and incentivized, but generally in certain lower-income countries the first part of waste management, the collection of waste, is not as functional. High income and middle-high income countries are able to collect from 80 to 90% of generated waste in their cities, while low income and middle-low income countries collect only about 30 to 50% of produced waste.[6] This represents harm for specific communities, as the uncontrolled presence of waste is linked to different illnesses and other concerning health issues.

[6] https://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html Trends in solid waste management, 2021, various authors, paragraph 3, lines 3-7.

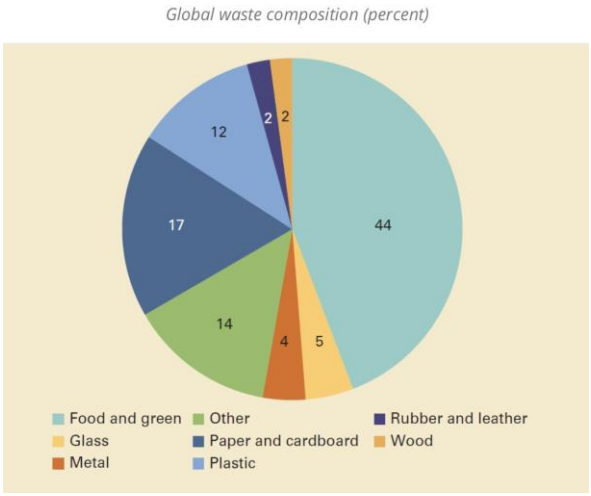

Image: The World Bank Data, (2021)

The composition of waste is also important in order to determine how it can be disposed of. As the graph shows, a large portion of waste is made up of recyclable materials such as plastic, metal, and glass, but the largest portion is made up of food and other organic elements. In high income countries, more recyclable waste is produced, while low and middle-income countries produce more food-related waste. Either way, altogether "it is estimated that 1.6 billion tonnes of carbon dioxide (CO2) equivalent greenhouse gas emissions were generated from solid waste treatment and disposal in 2016," and it is said that emissions "are anticipated to increase to 2.38 billion tonnes of CO2-equivalent per year by 2050 if no improvements are made in the sector."[7]

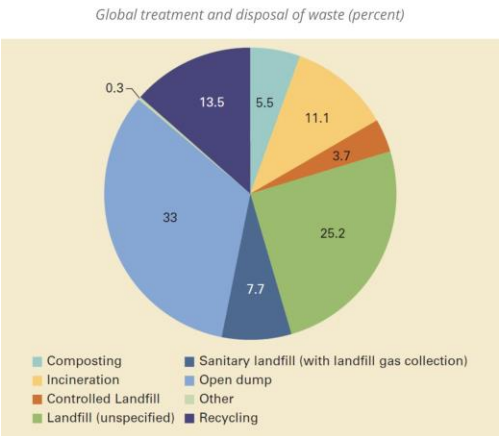

Image: The World Bank Data, (2021)

[7] https://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html Trends in Solid Waste management, The World Bank Data, 2021, paragraph 6, lines 1-3 and 8-9.

Relationship between waste and energy demand

As technology and population grows, so does the need for electricity. Currently, fossil fuels supply 80% of the world's energy demand. Globally, 100 million barrels of oil are consumed for electricity generation, and energy demand is expected to rise 49% by 2040. Sure, there are renewable energy sources, but as reliance on fossil fuels is so prevalent, some people consider it necessary to tackle the issue from a completely different angle, by converting waste into energy.

The process of turning waste into energy is through controlled incineration, which is why it's so controversial. But before judgement is made, the type of waste being used to produce the energy needs to be considered. In the case of organic waste, it is prone to produce more CO2 emissions than fossil fuel plants, but with non-organic waste, especially fossil-derived waste like plastic, the WTE plants produce a significantly smaller amount of emissions. These incinerator plants are considerably cost-effective, and offer a way towards more sustainable and efficient waste management and energy production. There is a current debate about whether or not these WTE plants should be implemented, or if it is more beneficial to introduce more efficient and environmentally-friendly plans for municipal waste management and energy demand.

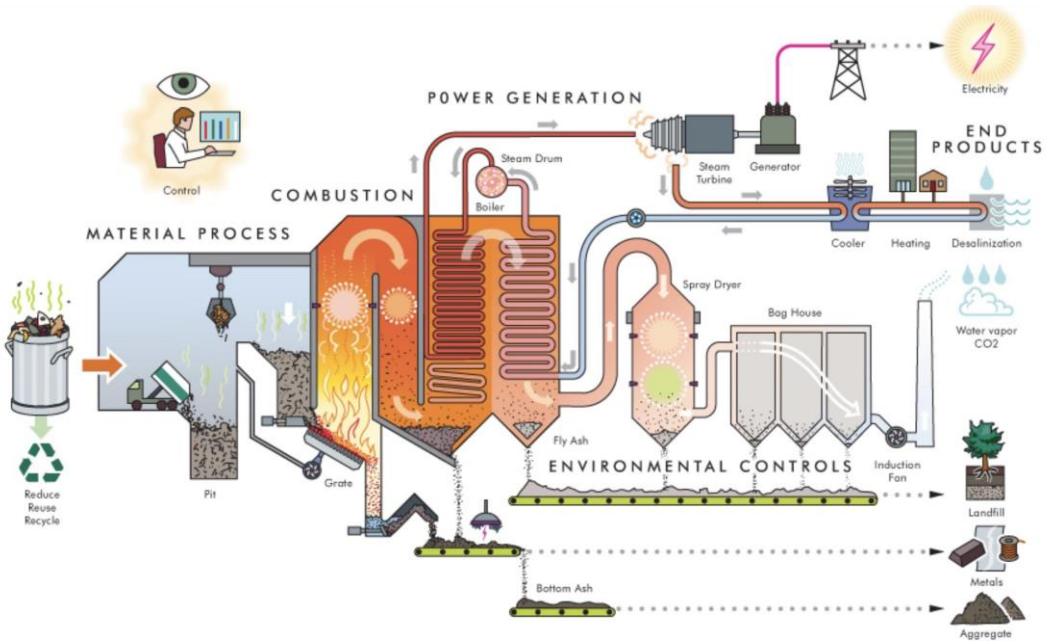

Image: Deltaway Energy, n/a

III. Key Points of the Debate

- Efficiency of currently used waste collecting systems.
- Difference in waste management in countries with different incomes per capita.
- Call for using more sustainable energy sources.
- Policies and legislation on “free dumping” on foreign territory.
- Health problems derived from mismanagement of waste.

IV. Participating Organisms

- Center for Climate and Energy Solutions (C2ES)
- United Nations Environment Programme (UNEP)
- Human Rights Watch (HRC)
- United States Environmental Protection Agency (EPA)

V. Guiding Questions

1. What initiatives has your country taken in order to tackle solid waste management?
2. What are the environmental impacts of your nation’s waste disposal systems?
3. Is your country affected by, or does it contribute towards, e-waste dumps in developing countries?
4. If improper waste management has caused collateral health issues within your nation's population (scavengers, waste workers, specific demographics, etc), please describe these issues.
5. What type of energy does your country utilize?
6. What is your country's annual energy consumption per capita?

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5. Topic 2: *Reducing the world's water footprint*

I. History/Context

What is the water footprint?

The water footprint measures the amount of water that is used to produce goods and services in a country. It is also used to measure how much water is consumed by particular entities, or how much fresh water is consumed globally in a certain period of time. This measure is utilized to understand the amount of freshwater available and how it is used.

There are three main types of water that are considered when measuring the water footprint. One is blue water, which is the fresh water that has been extracted from either surface or groundwater resources, is introduced into a product, evaporated, transferred from one body of water to another, or returned to the environment afterwards. Irrigation for agriculture, domestic, and industrial water use can have blue water footprints.

The green water footprint is the measure of water from precipitation, which is stored in the root zone of the soil and is evaporated, transpired, or incorporated into plants. This type of water footprint is mainly relevant for maintaining agricultural, horticultural, and forestry products.

Grey water footprint is the amount of fresh water required to assimilate pollutants in order to meet requirements on water quality. It considers point-source pollution discharges to freshwater resources, either directly through pipelines, or indirectly through leaching or runoff from soil, impervious surfaces, or other diffuse sources.

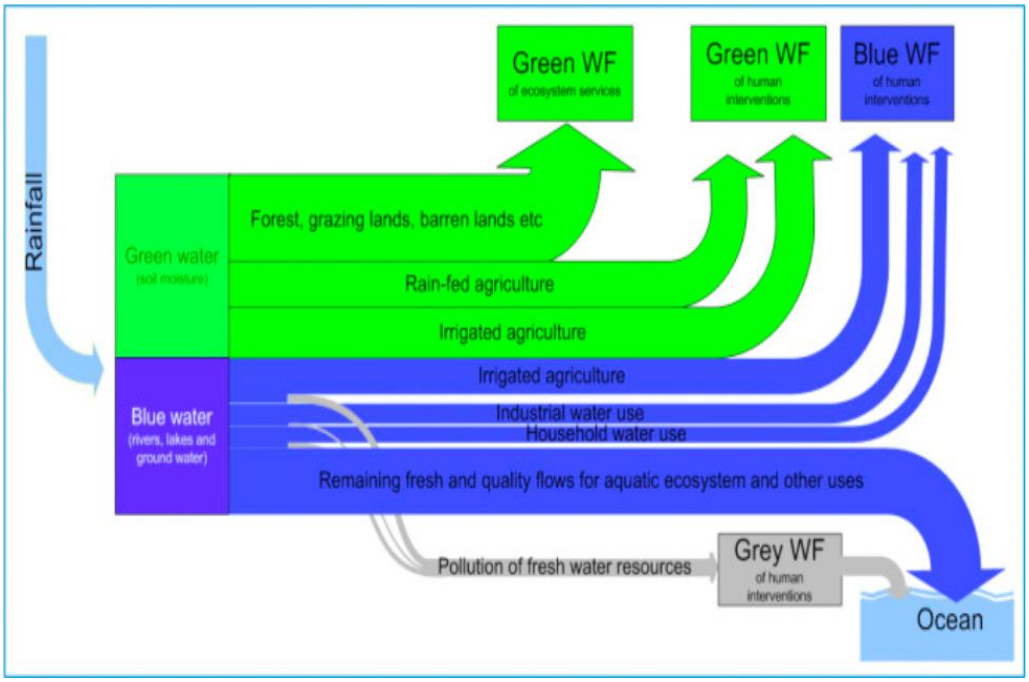

Image 1: Different components of water footprint and water partitioning in the hydrological cycle. (Science direct, 2021)

Water footprint (WF) is an important indicator used to calculate to what extent human pressure affects the world's fresh water supply. It was developed by Arjen Hoekstra in 2002, during his time at the UNESCO-IHE Institute for Water Education, to measure the amount of water used (consumption & pollution) in the production of goods and services. After this was introduced into literature, it became very popular among large companies that were suddenly aware of the quantity of water that they wasted, especially in food and beverage companies such as Unilever, SABMiller, Heineken, Coca-Cola, Nestle and Pepsico.

The primary goals of measuring water footprints are to connect human consumption to the management of freshwater resources. This concept was introduced into a water management science in order to demonstrate the importance of global dimensions and human consumption in regards to good freshwater governance (Hoekstra et al., 2009; Vanham and Bidoglio, 2014).

The calculations of the WF are useful in order to understand how freshwater is utilized by individuals, the environment, rural areas and cities. It promotes efficient freshwater management by analyzing supply and demand and sources. On a life cycle basis, there is indirect and direct water use. Direct water use is when individuals directly consume or

produce water. Indirect use, on the other hand, refers to the total volume of water used in the production of goods and services consumed by people in a country.

II. Current Situation

Though there are several points of focus when referring to the world's water footprint, the focus of this committee will be on the effects of the agricultural and textile industries on water, as well as the importance of resource allocation, and countries' efforts to protect water. It is worth noting that only 4% of the WF measurement is related to home use of water (cooking, showering, etc), and that almost 4 billion people face water scarcity according to UNICEF.

The agricultural industry

As population increases, diets shift and income changes; this sector is, and will continue to be, the main water consumer, with an approximate green and blue footprint of 5938 to 8508 km3/year. This Water Footprint is estimated to increase between 10 and 30% between 2012 and 2050 (Rushikesh G. Kakad , Dr. R. T. Pachkor, 2021). The main consumer of this Water Footprint is livestock, which includes cows, sheep, fish, and chicken. With crops, the unsustainable farming practices of wheat, sugar cane, rice, and corn are said to be worsening the situation, particularly in highly industrialized and commercial countries like the United States, China and India.

In the case of the agricultural sector, to feed a single person who consumes 2800 calories per day from any source (meat, vegetables, etc.) requires 1000 cubic metres of water per day to produce this amount of food. s. To consider, irrigation consumes 70% of the world's water inputs and this statistic will only grow to 14% over the next 30 years; 60% of all land suitable for cultivation will be farmed, and 10 of 97 developed countries in 2030 will be using 40% of all their available freshwater to support agriculture.

Table 1. Water Consumption by Dairy Cattle [1], [2]

Dairy Cattle Type	Level of Milk Production (kg milk/day)	Water Requirement Range[a] (L/day)	Average Typical Water Use[b] (L/day)
Dairy calves (1-4 months)	-	4.9-13.2	9
Dairy heifers (5-24 months)	-	14.4-36.3	25
Milking cows[c]	13.6	68-83	115
Milking cows[c]	22.7	87-102	115
Milking cows[c]	36.3	114-136	115
Milking cows[c]	45.5	132-155	115
Dry cows[d]	-	34-49	41

Image: Ministry of Agriculture, food and rural affairs Canada, Ontario, (2007)

The textile industry

In the textile industry, there is a long process to convert raw material into the final product. Firstly, pure cotton is spun in spinning mills in order to produce cotton yarn, and after necessary processing, this yarn is utilized to produce cotton fabric. In order for the fabric to be suitable for garment use, it must undergo the necessary treatments: bleaching, washing, dyeing, printing, finishing, etc. All this process requires immense amounts of water. For this industry, the annual water footprint was said to be 1.8 billion m^3. Water Footprints this high could lead to the depletion of groundwater levels, and could respectively lead to various major health problems for locals.

The image below shows blue, grey and total Water Footprints of the textile industry in the last 5 years. In 2016, the blue water footprint of knit and woven products was 102 and 77.5 million m^3, respectively, whilst the grey WF in 2016 of knit and woven products were 898 and 750 million m^3. The Total Water Footprint increased around 20% for both from 2012 to 2016. In order to supply this high demand for freshwater used in the textile industry in 2016, approximately 180 million m^3 of groundwater was extracted.

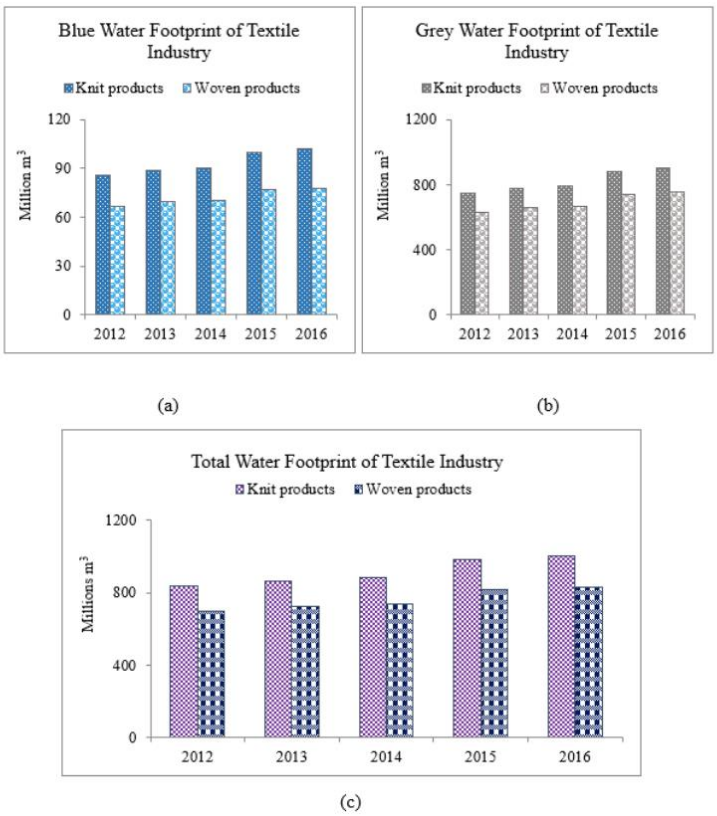

Image: Water Footprint Management for Sustainable Growth, (2020)

In the textile industry, the average percentage of the blue water footprint is 9%, whilst the other 91% belongs to the grey water footprint. This is due to the fact that the textile industry pollutes great quantities of water during textile processing. A water footprint can be internal or external; internal is when an industry uses its own domestic water sources, and external is the footprint that occurs when part of the manufacturing process is done in other countries.

As most of the materials utilized in this industry are imported unprocessed, the majority of the water footprint is internal (99.58%). The external water footprint usually consists of the cotton yarn and fabric that is dyed within the country, making up 0.42% of the total WF. In the graph below, the textile industry's internal and external water footprints are displayed (2012-2016). The Total Internal Water Footprint of textile processing was approximately 242 times higher than the Total External Water Footprint of textile processing (in 2016).

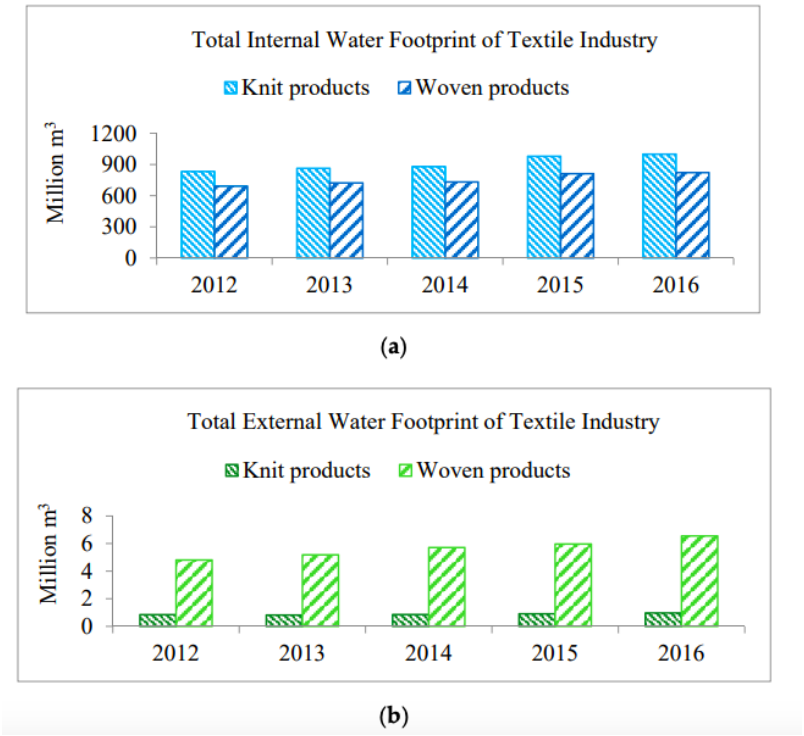

Image: Water Footprint Management for Sustainable Growth, (2020)

A high amount of water is consumed and polluted in the production and processing of raw material into the final product in the textile industry. More than half of the water footprint of this industry is polluted in the washing, dyeing and finishing of the fabric. The percentage of water footprints in spinning and manufacturing is very low because, in these stages, only worker water consumption and pollution is included. Approximately 28 % of the textile industry's water footprint is derived from yarn and fabric dyeing, as it comes from both the dyeing process and the workers' consumption. The figure below shows water footprints at different stages in the textile industry.

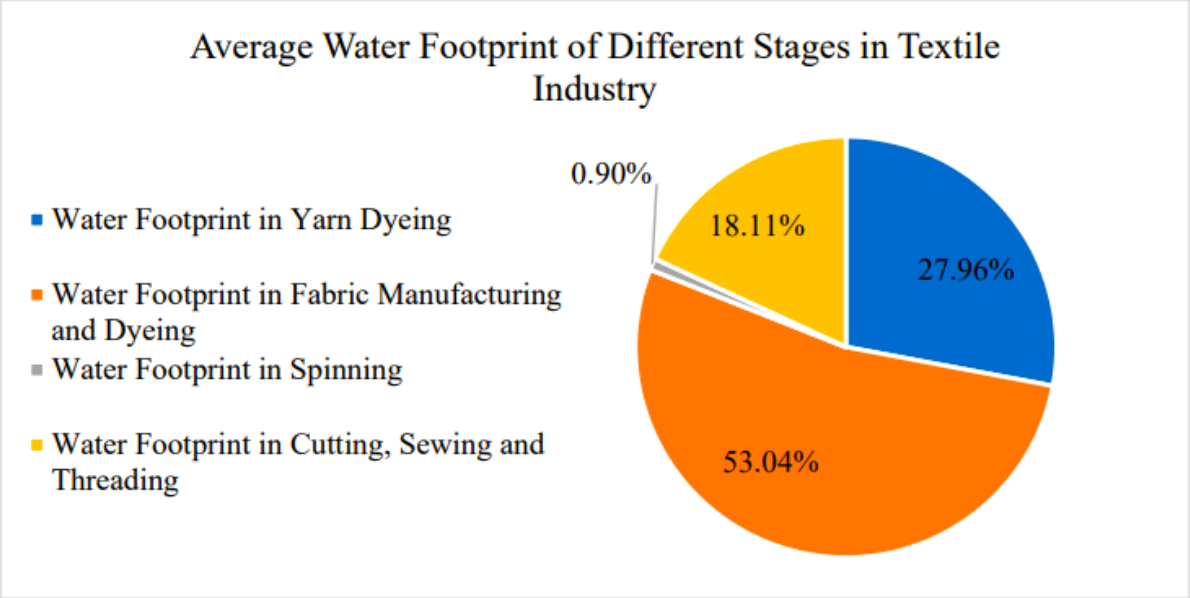

Image: Water Footprint Management for Sustainable Growth, (2020)

Resource allocation: equal access to water

Apart from providing water to industrialized sectors and companies, it also has to be considered to provide for those who need it most, the general population of the world. When referring to access to clean water in households, schools, and healthcare institutions, the term WASH services (water access, sanitation, and hygiene) is used. This covers all aspects of water management and distribution, including waste management. It is important to consider that access to water is a human need, thus a human right. Additionally, improving this would mean lower healthcare costs and spread of diseases, more workforce productivity, and even a way to promote gender equality.

The World Health Organization (WHO) estimated that the total monetary losses associated with inadequate WASH services amount to $260 billion US dollars annually in 136 low and middle-income countries. For the development goal of providing clean and safe water for everyone, it is estimated that the cost of improving WASH services in most middle and low-income countries would be $1.7 trillion from 2016 to 2030, or $114 billion per year. (UN Water Development Report, 2021). Also, this investment proposes a focus on rural areas which commonly lack or are deprived of these kinds of services.

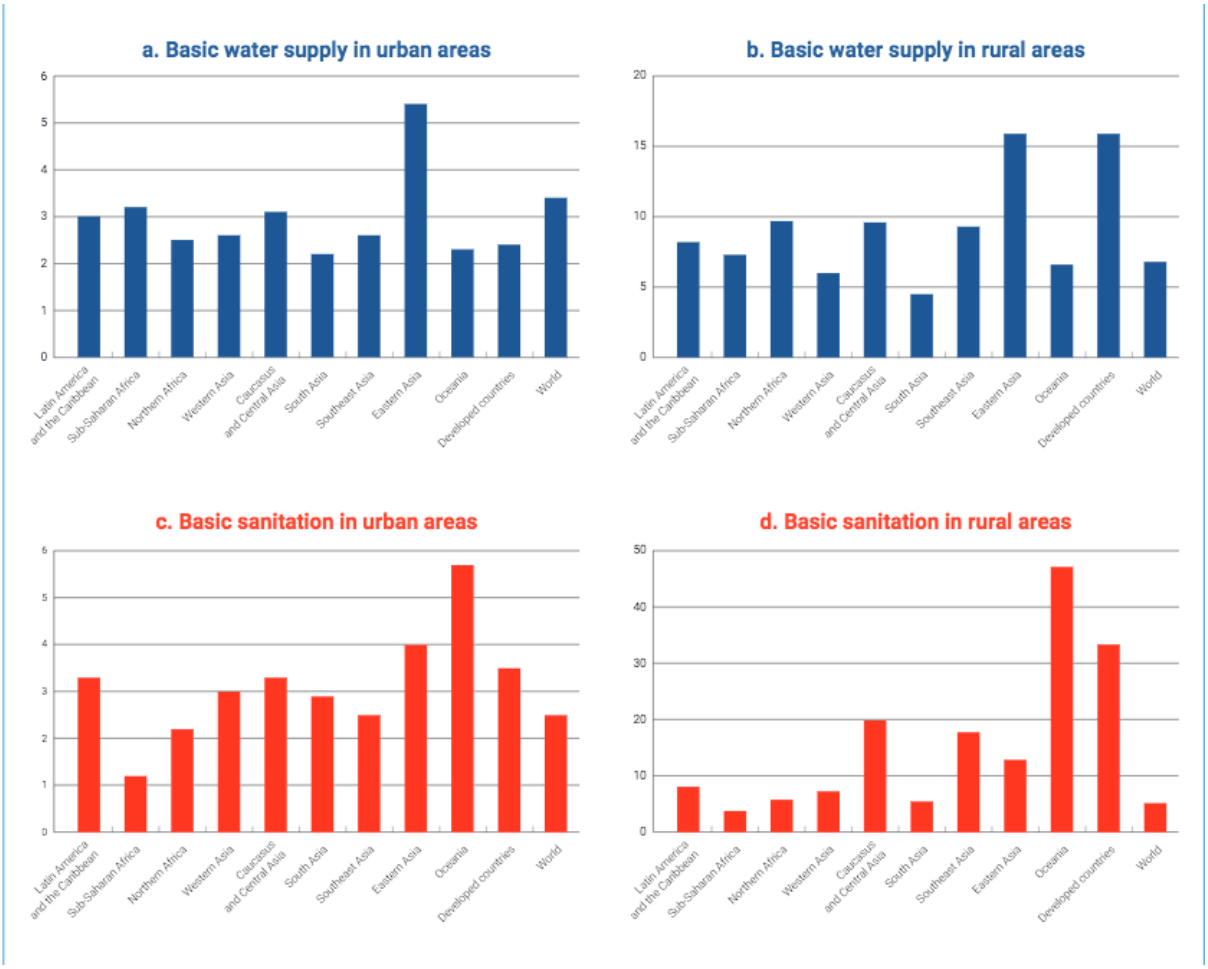

Image: UN Water Development Report, (2021)

As stated before, waste management within water distribution is important as it is linked directly to the pollution of the environment. Fortunately, options have been created to either treat and purify the water, or to use it for energy production. Either way it all depends on seeing the value of wastewater, and the development benefits it proposes. Currently, it is estimated that the value of wastewater is $1.1 trillion US dollars, expected to rise to $2 trillion by 2050.

Additionally, there are health related issues with water supplies. Approximately 60% of all global deaths are linked to impurities and diseases caused by untreated and unsafe water. Also, there is an increase in STH's (soil transmitted helminth) due to poor water access, with approximately 24% of the world's population being contaminated with these parasites. (WHO,2020). There is also the risk of malnourishment this issue poses, as almost 50% of all malnutrition and intestinal diseases are believed to be due to poor WASH conditions. Most of

these come from middle to low-income countries, which represent the majority of the world's population.

III. Key Points of the Debate

- Growth in agricultural and livestock water consumption.
- The relationship of overconsumption and the textile industry.
- Cost and conditions of implementing WASH worldwide.
- Monetary losses related to poor water treatment.
- Health risks associated with water quality in middle to low-income countries.

IV. Participating Organisms

- Global Water Footprint Network
- UNESCO (The United Nations Educational, Scientific and Cultural Organization)
- Environmental Sustainability in Textile Industries (ESTex)
- World Health Organization (WHO)
- Human Rights Council (HRC)

VI. Guiding Questions

1. How much of your country's water resources are imported/exported? What is the end-use of their import/export?
2. What regulations does your nation have to protect natural water resources?
3. What is the water footprint of your countries' textile, agricultural and food industries?
4. How does your country manage wastewater?
5. What are your country's statistics on health problems related to water pollution and quality?

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