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Research Article

A World of Waste: Rethinking Solid Waste Management from A Global Lens[1]

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ABSTRACT

Solid Waste comprises plastic bags, glass bottles, packing materials, discarded shoes, tins, lead, batteries, etc. It is dumped in seas and oceans, which are consumed by marine animals, thinking it is a food item for them. The rejected resources generated from commercial establishments, household sectors, industrial sectors, mining and agricultural sectors, etc., can be referred to as solid waste. As per the World Bank Report, waste originated from the household sector, commercial sector, business establishments, institutions, etc, may be defined as municipal solid waste, which differs from one jurisdiction to another.
There are international institutions, laws, and organizations that are assessing the world environment and its impact on the human community. Some of them are the Ramsar Convention 1971, the 1972 Conference of Stockholm, the 1972 Convention to Protect World Culture and Natural Heritage, the Vienna Convention for the Ozone Layer (1985), the Protocol which was held in Montreal, Canada (1987), etc. In this paper, an effort has been made to study the principles governing the international environmental laws, which are mainly concerned with the control and management of solid waste.

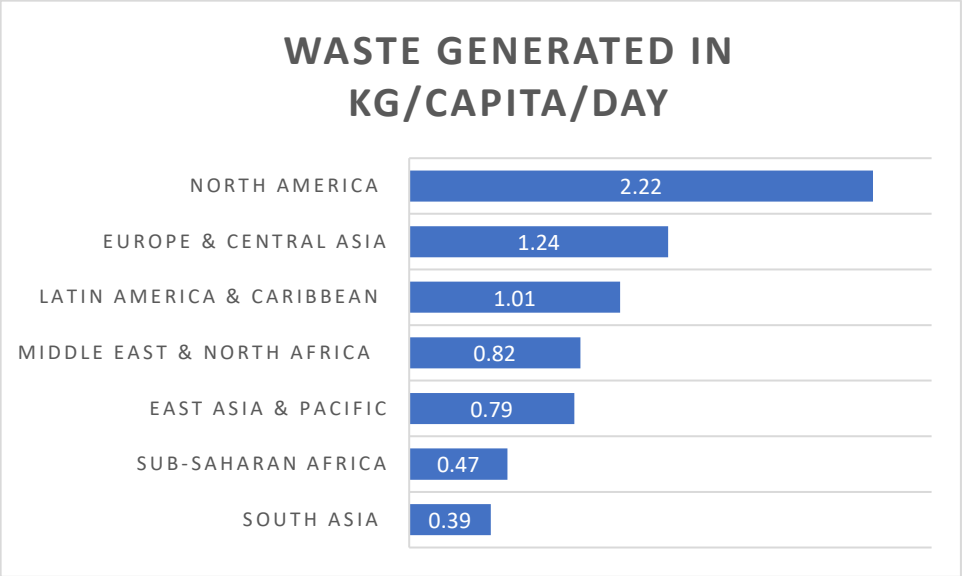
Keywords: Solid waste, Unwanted materials, international institutions, convention

Introduction

Solid Waste comprises plastic bags, glass bottles, packing materials, discarded shoes, tins, lead, batteries, etc. It is dumped in seas and oceans, which are consumed by marine animals, thinking it is a food item for them. The rejected resources generated from commercial establishments, household sectors, industrial sectors, mining and agricultural sectors, etc., can be referred to as solid waste.
As per the World Bank Report, waste originated from the household sector, commercial sector, business establishments, institutions, etc, may be defined as municipal solid waste, which differs from one jurisdiction to another.
Rapid urbanization and industrialization contributed faster generation of urban waste. There are different sources and types of solid waste. These are both hazardous and non-hazardous waste. Hazardous waste includes radioactive materials, electronic components, including car batteries, paints and solvents, chemicals, etc. Non-hazardous waste includes agricultural waste, plant and animal waste, etc.
There are international institutions, laws, and organizations that are assessing the global environment and its effect on living species. During the period of the Roman Empire, there was comprehensive planning about the "sink" of smoky chimneys. There were pollution control laws in Europe during the period of Middle Ages. In the year 1848, the Parliament of the United Kingdom passed the Metropolitan Commission of Sewers Act. This Act permitted the closure of cesspits around London with the help of the Metropolitan Commission.
The unbearable stench emanating from the disposal of sewage into the River Thames during the Great Stink of 1858 became so overpowering in the summer heat that it necessitated the evacuation of Parliament (Brimblecombe, 1987).

[1]This paper is a part of the Ph.D. Thesis entitled "Solid Waste Management Laws and Sustainable Development: A Study in Assam".

The Preservation of Fauna and Flora was approved by the Convention, which took place in London on November 8, 1933. It focuses on the importance of preserving, conserving, and protecting natural resources, especially in Africa, through the creation of national parks and reserves.
During the period of World War II (autumn,1940), 17 countries of the world, such as Costa Rica, Chile, Argentina, the USA, etc, sat together in Washington, D.C, to mediate a convention to protect and preserve wildlife resources of the western hemisphere. They stressed the protection of wildlife species in protected areas and by notifying national parks (Hunter, Streeter, & Snape, 2022).
To protect and preserve the species of whale, on 2nd December 1946, the International Convention for the Regulation of Whaling (ICRW) was held in Washington, D.C., USA
There are three main objectives of this convention. Firstly, it focuses on protecting all whale species from overhunting. Secondly, it ensures proper development and conservation of Whale stocks. And lastly, preservation of whale stock for the future generation (United Nations, n.d.).
In London, the great smog of 1952 created health problems, and the death toll increased by more than 4000. To protect the citizens of London from the smoke hazard, the Parliament passed the Clean Air Act,1956. The main objective of this particular Act was to minimise emissions from households and business establishments
The World Bank report, under the heading "More Growth Less Garbage". It is estimated by this report that by 2050 the waste generation will be 3.88 billion tons from 2.24 billion tons in 2020. In 2020, high-income nations generated 1.60kg/capita/day, upper-middle income nations generated 0.91 kg/capita/day, lower-middle income nations generated 0.47 kg/capita/day, and low-income nations generated 0.41kg/ capita/day.
The estimated waste generated in 2020 in different regions of the globe is as follows:



The bar diagram has been created by the researcher using the data from the World Bank Report titled "More Growth, Less Garbage".
Source: World Bank Report on More Growth Less Garbage

As per the report of "More Growth Less Garbage," five case studies conducted by five countries, such as the U.S, Japan, the Philippines, Slovenia, and the Republic of Korea, for successful reduction in residual waste. In the year 2008, Cambridge of U.S generated 0.71 kg/capita/day of residual waste, which declined to 0.51 kg/capita/day in the year 2019. The major reasons for the decline of this waste include recycling and proper management of city waste.
In Yokohama, a Japanese city, in the year 2001, household waste generated was 0.73 kg/capita/day, which declined to 0.46 kg/capita/day in 2010. This reduction was mainly due to reuse, recycling, and adequate technical and financial support given to the households by the government. It can be analysed from the case study that Japan's per/capita waste generation declined by 19 percent during the period from 2004 to 2017 (Kaza, Shrikanth, & Chaudhury, 2021).
Tacloban City, Philippines, launched a programme named Ecological Solid Waste Management in October 2016. They introduced a slogan in the household sector that is "No Segregation No Collection". There are four waste segregation channels they are biodegradable, recyclable, residual, and hazardous. It was found that waste dumped in landfills declined from 175 tons per day in the year 2016 to 121 tons per day by 2018. In the city of Tacloban, Philippines, source separation increased to 65 percent in 2019 from 10 percent in 2017.
Ljubljana is the capital of Slovenia. The country has 2 million inhabitants and it joined the European Union in the year 2004. Due to Proper management of waste, it became the European Green Capital in 2016. The city adopted door to door collection method for organic waste. The waste, which is recycled, is biologically treated and converted to energy. The city has reduced residual waste generated at the household level by 59 percent, and it has successfully secured a zero-waste goal in the year 2014.

In the Republic of Korea total municipal waste generated was 1.95kg/capita/day in the year 1990. But by the year 2000, it was 0.98kg/capita/day. The total reduction was 50%. The recycling rate of food waste in 1995 was 2%, which increased to 95% in 2019.

Some of the important international laws dealing with solid waste management are:

1. **Ramsar Convention 1971:** This convention was signed on 2nd February 1971 at Ramsar, Iran, and it was enforced on 21st December 1975. It has 23 signatories and 172 contracting parties. This convention aims to protect, preserve, and maintain wetlands through prudent use and management. Every year on 2nd February, World Wetland Day is celebrated throughout the globe.
2. **Stockholm Conference (1972):** The Stockholm Declaration was applied in the case of Trail Smelter for waste management. It was held in this case that it is the duty and responsibility of the state to make good any damage or injury caused by its citizens to other states. No state is entitled to utilize its land which will inflict destruction by fumes on other state territory, property, or persons as contained in the U.S and international laws. One of the important Stockholm recommendations was that the World Health Organization should increase its support to various governments of the globe to improve safe water supply and better sewage management through its community water supply program. The development assistance of the WHO will focus on setting up water supply services and all types of solid waste, as per the objective of the Second United Nations Development Decade.
3. **Convention on Prevention of Marine Pollution by Dumping of Waste and Other Matter (1972):** The main purpose of this convention is to protect and preserve the marine environment from anthropogenic activities. This convention has eighty-seven state parties. It has been enforced since 1975. It was amended in 2006. It has a total of 22 Articles. The major aim of this convention is to protect the sea from becoming a dumping ground for waste. The major highlights of this convention are as follows:
   - This convention does not permit the disposal of radioactive waste at sea.
   - Amendment to the London Convention in 1994 also prohibited waste incineration at sea.
   - In 1996, this convention prohibited the dumping of industrial waste at sea.
   - This convention permits ocean fertilization activities for exclusively research purposes.
   - In October 2022, it proposed the elimination of sewage sludge from the list of permitted materials for dumping.
4. **The World Climate Conference (1979):** It is the first World Climate Conference (WCC). It commenced in Geneva from 12th February to 23rd February 1979. It was sponsored by the World Meteorological Organization (WMO). The conference mainly focuses on four variables, such as identification of climate topics, Climate data, integrated impact studies, and research on climate change.
5. **World Conservation Strategy (1980):** This strategy was commissioned by the UNEP and WWF. It provides monetary assistance to prepare the fundamental themes and structure of it. To attain sustainable development, it is treated as a living resource.

   The main purposes of this Strategy are as follows:
   - It is a living resource conservation for the survival of human beings, at the same time, to achieve sustainable development.
   - This strategy identifies the priority conservation issues and deals with them.
   - It also proposes an efficient waste management strategy for achieving the strategy's aims and objectives.

   The World Conservation Strategy focuses on the following areas:
   - It provides guidelines for living resource conservation.
   - To support and maintain important ecological processes.
   - Protection of genetic diversity.
   - Careful use of species and ecosystems in a sustainable manner.
6. **World Charter for Nature (1982):** It was issued by the UN General Assembly in 1982. It contains twenty-four Principles. The general principles urged for the respect of nature, the uncompromised genetic viability of the earth, optimum sustainable production from the ecosystem and the organism. It also claims that nature should be protected from warfare or other hostile activities.
7. **Vienna Convention for the Protection of the Ozone Layer (1985):**
   This convention was adopted in 1985. It went into effect on 22nd September 1988. It stated that the parties to the convention should cooperate, perform research activities, and share information so that the ozone layer can be protected from human activities.
8. **Montreal Protocol for Ozone Depleting Substances and Hydrofluorocarbons (1987):** This convention came into force in 1989. It aims to protect the ozone layer by minimizing ozone-depleting substances in the atmosphere. This convention also makes an effort to establish steady reduction requirements for both developed and developing nations concerning crucial substances such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), and halons. These requirements extend to various industrial sectors, encouraging the gradual cessation of the use of these dangerous substances.
9. **Brundtland Report (1987):** It was published in October 1987. It contains the following parameters:
   - A Threatened Future

- To attain sustainable development with common interest,
- Global cooperation on environmental issues.
- To maintain global food security,
- Management of oceans, space & Antarctica and
- Maintenance of peace and security for development

10. **Basel Convention on Hazardous Waste (1989)** This convention prevents the transportation of waste from developed to developing nations. This convention highlights that hazardous waste disposition should be in a sustainable manner. This Convention came into force in the year 1992. The regulatory approach of this convention is to set up a 'prior informed consent' (PIC) regime. If a contracting party permits the importation of goods, the exporting state's government is obligated to provide advance notification to the governments of the transit states through which a waste shipment will pass before initiating the shipment. Generally, this convention puts restrictions on exports from parties to non-parties, and at the same juncture, it restricts transboundary movements of wastes.
11. **Bamako Convention (1991):** This convention was signed on 30th January 1991 by twelve African countries at Bamako, Mali, and it came into force on 22nd April 1998. There are two objectives of this convention: firstly, it puts restrictions on the import of hazardous waste into African countries. Secondly, it put restrictions on the movement of transboundary waste within African nations.
12. **Waigani Convention (1995):** This convention has a provision that prohibits the importation of toxic and radioactive waste into Forum countries of the South Pacific. The main aim of this convention is to restrict the movement of waste in the South Pacific region of the Globe.
13. **London Protocol of 1996:** This protocol was enforced on 24th March 2006. To protect marine life from pollution, it bans all types of industrial and other waste into the sea.
14. **Kyoto Protocol (1997):** It was implemented in 2005. Under this protocol, developing nations should reduce their emission of six types of greenhouse gases. These gases are Sulphur Hexafluoride, Methane, Perfluorocarbons, Carbon dioxide, Nitrous Oxide, Hydrofluorocarbon, and within a given period from 2008 to 2012. This protocol was amended in the year 2012 and included a new gas, such as Nitrogen Trifluoride, within a period which ranges from 2013 to 2020.
15. **Rotterdam Convention (1998)**: On 10th September 1998, this convention was executed and it was enforced on 24th February 2004. It was hosted by UNEP and FAO. With the expansion of chemical industries in the global arena, many developing nations find difficulty in monitoring the import and use of these hazardous chemicals. This convention applies to 22 pesticides and 5 industrial chemicals. At present, it applies to 35 pesticides and 16 industrial chemicals.
    This convention performs a crucial function in safeguarding the health of citizens from environmental degradation. The core purpose of this convention is as follows:
    - To promote information exchange about certain hazardous chemicals.
    - To provide a national decision-making procedure for imports and exports.

    As per Article 3 of this convention, it imposes restrictions on chemicals and severely hazardous pesticide formulations.
16. **European Union on Waste Management**: The European Union is very concerned with solid waste management mechanisms. They have formulated policies and legislation to check the unwanted burden of solid waste. Their main policy is to obtain a higher level of recycling and limit the extraction of natural resources.

Summary and Analysis:

Although there are international environmental conventions and agreements between different parties, a significant gap can be observed in the implementation of these conventions and agreements, especially related to the control and management of solid waste.

The international conventions, treaties, laws, and protocols have failed to provide with binding legal obligation, which has led to verbal commitments without strong accountability. Secondly, it was found that the legally binding agreements of the conventions, such as Basel, Rotterdam, and the London Protocol of 1996, have suffered from enforcement gaps. As a result, developing nations are exploited due to their weak legal systems (Puckett, 2020).

Thirdly, the doctrine "prior informed consent" embedded in the Basel Convention has been criticised for its vague classification and improper monitoring mechanisms (Clapp, 2001). It can be observed from analysing the international environmental convention that the solid waste management domain of the international environmental laws is not specifically addressed. Moreover, several aspects of waste management are not addressed properly. For instance, the concept of sustainable development, which was contained in the Brundtland Report of 1987, lacks a proper roadmap for linking the environment and protection with that of economic planning and social inclusion. Similarly, the European Union's circular economy, although it deals with recycling and resource recovery but its application to developing countries remains a challenge due to economic constraints and technological dependence (European Commission, 2020).

Thus, we can conclude that the present global design of environmental conventions represents a fragmented and inefficient approach. Although the major aim of these conventions and treaties is to raise awareness and to eradicate pollution and promote sustainable practices, their application remains a constraint for achieving these long-term goals.

Therefore, there is a crucial need for a comprehensive International environmental instrument that specifically deals with the issues of solid waste management by integrating the social, economic, and cultural practices of the particular region along with a global synchronized system of finance, monitoring, and compliance.

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