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Willingness to promote Environmental impacts in Japan, Conceptual Framework with Environmental and Economic Solutions

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Abstract:

The Purpose of this paper discusses Japan's willingness to promote a sustainable future. Japan is involved in many practices that hurts the environment. From toxic wastes pollution, air pollution and marine life depletion. We aim to identify the unsustainable practices and discover the regulations set by Japan to reduce those violations. It will be followed by a strategy evaluation section that will critique the active regulations. A sustainable framework will be proposed at the end of the paper. The Methodology used Secondary sources will be used. Academic and non-academic articles. Statements from the ministry of environment in Japan. The Findings shows current regulations used by Japan are not strong enough to prevent such practices. The radioactive wastes solution is just temporary and can't handle unexpected malfunction. The proposed framework is prepared to tackle individual malpractices only if the funds are spent domestically instead of internationally.

Keywords:

Sustainability, Economics, Environment, Japan



Study Background

The aim of the report is to discuss the willingness of Japan to encourage a sustainable future. The report is intended to recognise the unsustainable activities in Japan and explore the rules and laws introduced by Japan to decrease violations. However, it is identified that differences in temperature can be noted with the alteration in the seasonal wind and also changes in ocean currents. Natural disasters like tropical cyclones, which frequently intensify into typhoons and impose the loss of life and property, are a major threat to the nation. Environmentalists believe that the region's heavy rains are to blame for the climate change that has begun to affect human life in Japan. This is a recent development in the climate of the country. One of the primary environmental issues facing the nation is solid waste contamination, which the government is working to address. It was observed in 2014, and the nation generated around 437 tonnes of rubbish, of which only 44 million tonnes, or about 10%, were a municipal waste. The other 393 million tonnes, or almost 90% of the total waste generated, were other types of waste. Another custom in Japan that puts the survival of species in peril is the "bidding wars," which can cost millions of dollars and call for using an endangered species as bedding. As a result, Japanese fishermen are motivated to capture and kill endangered animals. Moreover, another issue that is affecting the marine life in the seas of JAPAN is plastic pollution of the water, with the nation producing 32.4 kg of packaging waste per person, which severely pollutes marine life. Further, it is noted that the lack of landfill and adverse situation of the disposal sites have directed the government to arise with some rules and laws that are "Containers and Packaging Recycling Law (1995)", "Basic Environment Law (993)", and "Dioxins Control Law (1999)". Studies demonstrate that "Plastic Resource Circulation Act" "increases circularity by addressing the entire lifespan of plastics," which promotes the reduction, reuse, recycling, and renewable energy. Its central principle is the use of financial incentives to compel companies to make fewer single-use plastic items and to develop and use more circular production processes and systems. In contrast, the study used a secondary method to conclude the findings of the study. The information has been gathered from academic and non-academic articles. Hence, the findings illustrate that Japan's current rules and regulations are not strong enough to stop such activities. Further, it states that waste created by radioisotopes, radiation, accelerators, and other nuclear technology is regulated under the Law Concerning Prevention of Radiation Injury due to Radioisotopes, etc. The already-

existing legislative structure has picked the relevant authorities. It should be emphasised that these rules generally operate under the presumption that radioactive wastes are produced in a controlled setting. They are also handled and stored carefully. If the funds are used domestically rather than globally, the study has also developed a framework that is prepared to address individual misconduct.

1. Introduction

Environmental challenges are present in almost every region of the world as human action and activities have already done some serious or, better to say, irreparable damage to the environment. Environmental change is eminent in every part of the world, and this change in the environment has become a threat to the survival of all living beings in the world, including human beings. The present study investigates the most threatening environmental challenges for the country of JAPAN and what are the policy responses and strategies that the country of Japan has put in place for minimising the impact of such environmental challenges. The major environmental issues that are affecting the flora and fauna of the island nation of Japan can be identified as solid waste pollution, radioactive waste pollution, and loss of balance in the marine world. The study invests in detail the major causes of such pollution and how some changes in the operational behaviour of the government and the growing population can bring some change to the environment in a positive way apart from the measures being implemented by the government of JAPAN by way of policy regulations.

2. Overview of Japan

JAPAN is an Island nation that is situated on the east coast of Asia. The island nation is made of four major islands that can be identified as Hokkaido, Honshu, Shikoku, and Kyushu, along with many other smaller Islands. These are the islands that are stretched across 1500 miles across the North Pacific Ocean from North to South. "Honshu" is the largest island of the country, and these four islands together have formed the total land field of the country. Thus, the country of Japan has limited land space that can be used for residing or making a factory or ploughing. The island nation has a hilly terrain, and most of the population lives in the flat land near the river, which is often referred to as the lowland. The country is falling in the seismic range and is exposed to small and large earthquakes. Due to the wide presence of the mountains, it has become an issue for the country to connect the different regions to support the growing urban population of the country. Due

to the limited landfill, the urban citizens are staying in densely populated urban areas. Japan is one of the countries with a very high population density. In 2021 the population of JAPAN is around 125.50 million, and around 338.2 persons per square kilometre are living in the country of JAPAN (Statistical Handbook of Japan 2022, 2022).

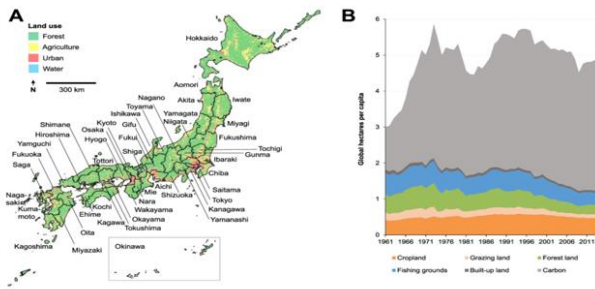


Figure 1
https://www.researchgate.net/figure/fig-1-Land-use-47-prefectures-and-Ecological-Footprint-of-Japan-A-Map-of-land-use_fig1_348616215

2.1 Climate of Japan

The climate of the country of Japan can be defined as the temperate marine climate where in most of the regions of the country, there is very soothing, or low temperature can be felt. However, the variation in temperature can be observed with the changes in the seasonal wind as well as changes in the ocean currents. The mountain-filled terrain on the island of Honshu, where the mountains are spread from the north to the south, the country experiences a highly humid winter season as the northwest monsoon wind brings snow and rain to the Sea of Japan side. However, the winter weather remains comparatively dry on the shores of the Pacific Ocean. The climate of Japan is being characterised by two different kinds of long rainy seasons that hits the country during early summer and Autumn. During the phase of early summer, the rainy season hits the country as the southeast monsoon wind begins to blow. The rainy season again hits the country in Autumn when the southeast monsoon wind stops blowing. The country is very much exposed to natural disasters like tropical cyclones that often get transformed into typhoons and become the cause of destroying human lives and assets. The torrential regional rainfall has become a new climatic issue in Japan where the environmentalists are of the opinion that this is the cause of climate change that has started to hit human lives in Japan (Japan, 2022).

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Figure 2

<https://www.tofugu.com/japan/japan-climate/>

3. Japan Environmental Issues and Challenges

3.1. Solid waste Pollution:

Solid waste pollution is one of the basic environmental challenges of the country that the authorities are looking to fight back. In 2014 the country produced around 437 tons of waste, of which only 44 million tons, or around 10%, was a municipal waste, and the rest 393 million tons, which is around 90% of the total waste being generated is industrial waste. Looking at the statistics of the year 2016, it can be observed that the country of Japan generated around 43 million tons of municipal waste, and thus the country has managed to reduce the volume of the production of municipal waste over the years. Looking to the rate at which solid waste was being generated in Japan, was around 925 grams per person per day with respect to each person who is living in Japan. Thus the country of Japan is suffering from quite a high rate of solid waste generation per person in the country but the point of hope to be noted is that the country has managed to generate a declining trend in both the total production of solid waste and per person generation of solid waste over the years.

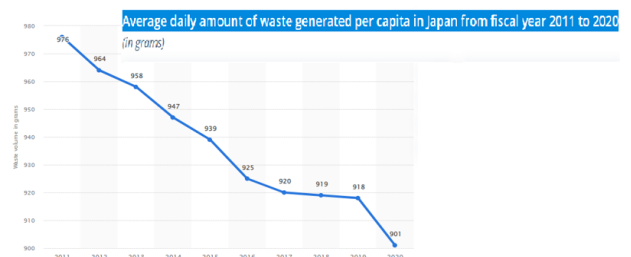


Figure 3
 (Statista, 2022)

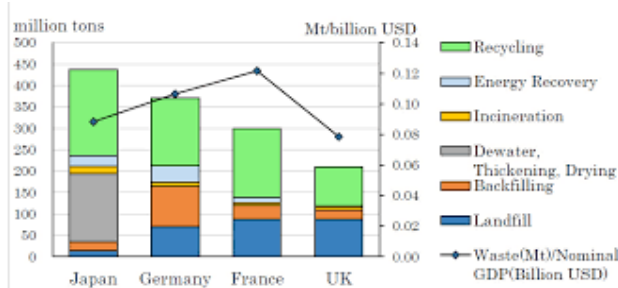


Figure 4

(Amemiya,2018)

Looking at the per-capita waste production in Japan for the period of 2011 to 2020, a continuously declining trend can be observed, and the waste production per capita has declined from 976 grams to 901 grams. Thus, the country of Japan has achieved a per capita waste reduction rate of $(976-901)/10 = 6.6\%$ over a period of a decade (Statista, 2022).

However, in the fiscal year of 2020, the total waste generated in the county was around 41.7 million metric tons, out of which household waste formed the biggest proportion. Thus, the growing household waste has become a big issue for the country over the years.

However, it should be taken that the toxic nature of industrial pollution is a concern for the country. The most toxic components that are present in the industrial waste can be identified as "sludge", "waste oil", "soot and dust", "imported waste", etc. In 2019 the Island nation generated industrial wastes round 386 million tons out of which 80% was formed with components like Sludge, animal excreta, and debris, all of that is highly toxic. A look at the situation of non-industrial waste production in the country Japan in 2019, the country generated around 43 million tons of waste, where the per person per day production rate was around 918 grams.

The major waste disposal methods that are being followed in JAPAN can be identified as incineration, recycling, landfill, and backfilling.

The country has managed to recycle around 80% of the industrial waste into construction materials, fertilisers, and other materials, and this has reduced the volume of landfill dumping, especially in a situation where the country is suffering due to the shrinkage of open landfills that can be used for dumping. The process of recycling has reduced the volume of landfill dumping from 89 million tons in

1990 to 9 million tons in 2019.

"Incineration" is one of the major processes of the waste recycling process in the country where the solid waste is burned at a high temperature, and the emitted gas (dioxins) is passed through several stages of cleaning and filtering so that the hazardous material like dioxin and mercury can be prevented from entering the air. However, the main waste product of this process of "Incineration" is the ash which can easily be dumped into the waste field as little or minimal toxin is present in that ash which can result in air or land pollution. In the city of Tokyo, a regular incinerator as reported by the source can handle around 600 tons of garbage daily which is an amount of solid waste that has been manufactured by around 600,000 people of the country (Too Much Waste Straining Japan's Limited Landfill Space, 2018).

3.2. Plastic waste pollution in Japan:

Plastic waste pollution is no doubt a part of solid waste pollution, but the discussion has been carried out with a special focus as plastic waste pollution is a burning issue for the country, JAPAN, and the country is still struggling to manage plastic waste pollution.

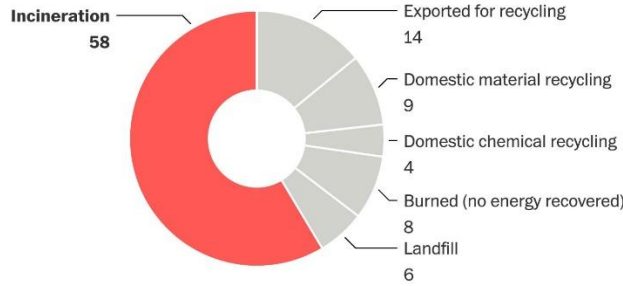
Plastic production in the Island nation has increased from 14 billion in 2004 to 23.2 billion on a yearly basis. Even if the country has advanced recycling technology, but still controlling plastic pollution is difficult for the nation; where even if 2.6 billion plastic bottles are being incinerated but a substantial portion of the bottles (out of the portion of 23.2 net of 2.6 incinerated bottles that is 20.6 billion of bottles) are often being dumped in the landfills or just left for flowing away to the river as well as ocean and thus results in land and water pollution. Plastic pollution is also being generated from plastic packaging waste, where the nation produces 32.4 kg of packaging waste per person on average. Plastic pollution is affecting almost 90% of the marine species in the country that are not in good shape (japantimes.co.jp, 2022).



Figure 5

<https://www.theguardian.com/world/2019/jun/27/japans-plastic-problem-tokyo-spearheads-push-at-g20-to-tackle-waste>

How Japan disposes of discarded plastic (percent)



Source: Plastic Waste Management Institute Japan

SIMON DENYER/THE WASHINGTON POST

Figure 6

https://www.washingtonpost.com/world/asia_pacific/japan-wraps-everything-in-plastic-now-it-wants-to-fight-against-plastic-pollution/2019/06/18/463fa73c-7298-11e9-9331-30bc5836f48e_story.html

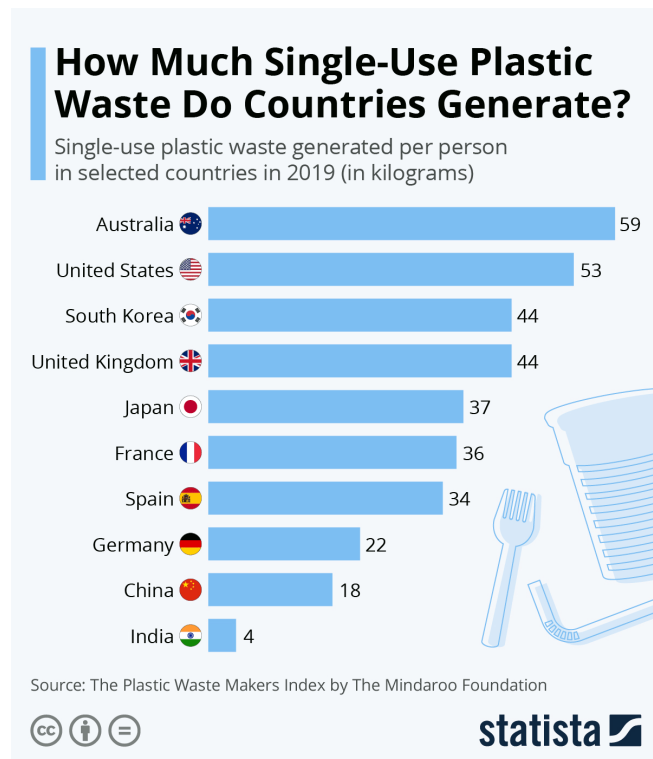
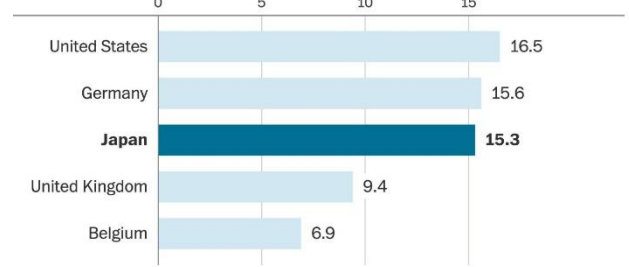


Figure 7

<https://www.weforum.org/agenda/2021/09/zero-waste-shopping-japan/>

Leading plastic waste exporters (percentage of total exports)



Source: Greenpeace

SIMON DENYER/THE WASHINGTON POST

Figure 8

https://www.washingtonpost.com/world/asia_pacific/japan-wraps-everything-in-plastic-now-it-wants-to-fight-against-plastic-pollution/2019/06/18/463fa73c-7298-11e9-9331-30bc5836f48e_story.html

3.3 Global Warming and destruction of a coral reef:

The Island nation is also suffering from global Warming that is being caused by the emission of greenhouse gases. In 2019 the island nation emitted around 1212 Mt CO₂eq, with a per capita emission of 9.31 tonnes in 2017. In 2019 the volume of greenhouse emissions by the country of Japan was around 2% of the annual total global production of greenhouse gases. The main reason behind the generation of greenhouse gases in the country of JAPAN can be identified as coal combustion, where the combustion has occurred due to the generation of electricity. 30% of the electricity of the country is being generated from the combustion of the coal. A look at the sector-wise generation of greenhouse emissions reveals that the energy sector emitted a total of 432.93 Mt(2019), the Industry sector has emitted around 279.2 Mt (2019), and thus the energy and industry sectors are the two main sources of co₂ emission in the country of Japan. In 2020 the nation released around 422 million tons of Co₂, which accounts for 90% of the total volume of greenhouse gases being emitted by the country.

The emission of greenhouse gasses that are resulting in a rise in temperature is causing the country to observe changes in weather, and the country of Japan is now more vulnerable to natural disasters like a storm or unexpected heavy rain that can lead to sudden flood situations in the

country.

The rise in temperature, as well as climate change, is badly affecting flora and fauna of the nation. For example, in the southern part of Hokkaido, the home of a range of mammals, fishes, and vascular plants that used to survive in warm, humid weather are already facing a threat of extinction due to the temperature rise.

According to the environment ministry of Japan, the coral reefs of JAPAN are dying due to the bleaching effect caused by the rise in seawater temperature, and lots of fishes and sea insects for whom coral reef was the home has to fight back for survival (Carbon dioxide emissions in Japan in fiscal 2020, by sector, 2022).



Figure 8
<https://www.theguardian.com/world/2017/jan/12/almost-75-of-japans-biggest-coral-reef-has-died-from-bleaching-says-report>

Global Contributions to Greenhouse Gas Emissions (2012)

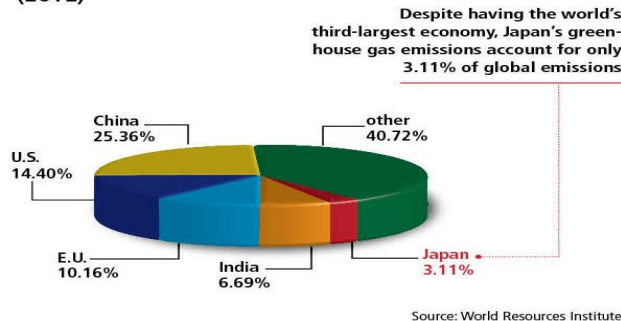


Figure 9
<https://foreignpolicy.com/sponsored/japanus/global-commitment/>

3.4 Radioactive waste pollution:

The country of JAPAN has decided to release the radioactive wastewater from the infamous Fukushima Daiichi nuclear power plant disaster into the ocean as a permanent dumping solution has raised strong resentment across the world. The release of heavy wastewater in the sea is supposed to badly contaminate the whole sea water and endanger marine life. The fishery industry of JAPAN has already detected an 8% presence of caesium in fishery products. The presence of caesium in water refers to an explosive action with the water and thus defines the presence of an ender for marine life in the seas around Japan (Xinhua, 2022).



Figure 10
<https://www.dw.com/en/fukushima-how-the-ocean-became-a-dumping-ground-for-radioactive-waste/a-52710277>



Figure 11
<https://pixabay.com/photos/pxclimateaction-nuclear-waste-4168906/>

3.5 Marine life destruction:

Access to commercial whaling (for the purpose of scientific research) and auctioning is one of the major reasons that are endangering the life of marine animals in the seas and oceans around Japan. So far as protecting marine life is concerned, this technologically advanced nation is not playing a very significant role in protecting marine life. The country is not in coordination with other countries to protect marine life. The citizens of Japan appear to be little aware of taking some significant steps to protect the marine life of the country.

Not only whale hunting, it is also legal to hunt down dolphins in Japan, and in recent times, around 2040, dolphins have been killed in the country in the name of tradition and culture in the country of Japan. The dolphin meat is also being sold outside the villages (where hunting is a tradition) as a delicacy.

The "bidding wars" are another tradition in JAPAN that is endangering the life of the species in the country as the tradition requires that placing an endangered species for bedding and it can cost millions of dollars. Thus instigates the fishermen of Japan to capture and kill the endangered species.

Plastic pollution of the marine water is another problem that is endangering the marine life of the seas of JAPAN, where the country produces 32.4 kg of packaging waste per person, which is badly polluting the marine life (a-deep-dive-into-japans-questionable-treatment-of-marine-life, 2019).



Figure 12

<https://oursharedseas.com/threats/threats-habitat-and-biodiversity/>

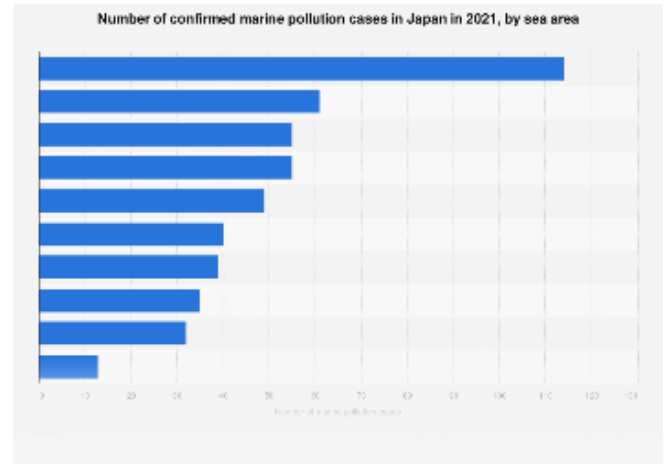


Figure 13
<https://www.statista.com/statistics/699609/japan-number-of-marine-pollution-cases-by-sea-area/>

4. Measures were taken to ensure Sustainability.

4.1. Solid waste management regulations

A look at the history of the effort given to managing solid waste in the island nation of JAPAN requires the discussion of the following regulations.

Waste Sanitation Law (1900):

The law was being initiated as rapid urbanisation started to take place in JAPAN, and the main objective of initiating this law was to clear the solid waste or, say, night soil that was accumulating in the various municipality of JAPAN. As per the specification of the law, individual municipalities were responsible for clearing the solid waste that was getting accumulated in the different residential and municipal areas.

Public Cleansing Act (1954):

The regulation was initiated in the post-2nd world war period when the production of solid waste suddenly started to increase in the country due to economic revival. The main objective of initiating this law was to clear the solid wastes quickly as possible from the residential region to protect the citizens of the country from the bad effects of solid waste pollution.

Waste Management and Public Cleansing

The act was originally initiated in 1970 with the objective of clearing the wastes released by the industrial sector due to the country's rapid economic growth. The main objective of the law was to protect the environmental concern related to the management of waste. The law

requires that industrial waste generators and the municipality will be responsible for the selection of the waste generation criteria. The law was again amended in 1976.

Regulations initiated to protect the environment from the act of waste disposal:

The previous municipal solid waste management laws in JAPAN were burnt or boiled through incineration as a method of final disposal of the wastes, and the process of incineration resulted in the emission of a large volume of Dioxins that started to pollute the air very badly. The shortage of the landfill and the bad situation of the final disposal sites have also led the government to come up with some legislations that are as follows:

- “Basic Environment Law (993)”
- “Containers and Packaging Recycling Law (1995)”
- “Dioxins Control Law (1999)”

The main features that were expected from the implementation of this law are to promote and make aware the people regarding the importance of waste discharge so that the people equally contribute to the process of waste discharge along with the municipal authority.

The law was also being enacted for promoting the fact that the government authorities are working for giving safe and protective life to the citizens of JAPAN through imposing the responsibility of waste disposal over the government authorities. The laws were also being initiated to promote that is consciously working for protecting the environment by making proper management of waste.

The following set of waste management laws were being initiated to promote the growing awareness in the country of JAPAN that it is high time to protect the environment by following the global standard and through the optimum utilisation of the available resources.

- “Basic Law for Establishing a Sound Material-Cycle Society (2000)”
- “Construction Material Recycling Law (2000)”
- “Food Waste Recycling Law (2000)”
- “End-of-Life Vehicles Recycling Law (2000)”
- “Small Home Electric Appliances Recycling Law (2013)”

“Sound material society” can be established as the laws mentioned above is aimed to promote the 3Rs concept of Recycle, Reuse and Reduce. The laws were also being enacted to combat illegal dumping and to have more control over the disposal of industrial wastes.

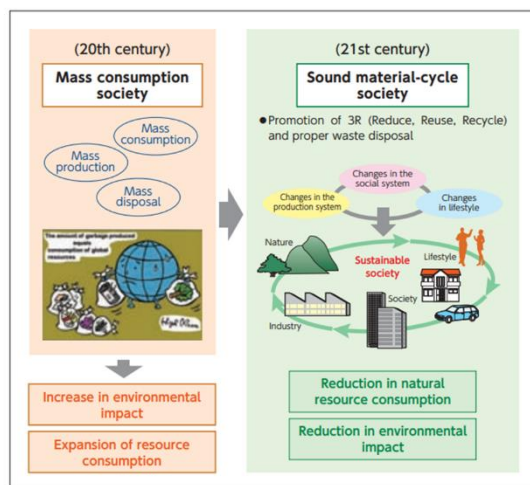
The situation of solid waste management in the country of Japan has reached to an alarming state due to the continuous reduction of the open landfills that are ready to absorb more solid trash. Thus, the phenomenon of illegal dumping is on the rise, and the whole situation is getting worse. This alarming situation has led to the development of a basic act of the “Sound Material-Cycle Society” that was brought into action in January 2001. The law comes up with the basic principles that must be followed for the development of a sound material-cycle society. The law has given a legal framework to address pollution problems like the disposal of solid waste and the recycling of automobiles and electrical appliances. The above-mentioned laws have also strengthened the concept of the 3Rs of reducing, reusing, and recycling in waste management. However, recently the government of JAPAN is focusing on the 2Rs of Reduce and Recycle following some social concerns (Japan Industrial Waste Information Center, 2018)



Figure 14
<https://ipcaworld.co.in/2017/09/11/why-is-solid-waste-management-indispensable/>

4.2. Regulation for controlling plastic waste:

The act called “The Plastic Resource Circulation” promotes the reduction, reuse, recycling and renewable and increases circularity by addressing the whole lifespan of plastics (i.e., from product design through plastic waste disposal). (env.go.jp, 2022) Its basic tenet is to employ subsidies to persuade businesses to produce less single-use plastic and to create and implement more circular product designs and systems. Examples include refill items with minimal packaging and recycling product collecting centres established by the firms. The law encourages municipalities and manufacturers to collect and recycle plastic items. Businesses that follow the guidelines are given 150,000 yen by the ministry. This enables them to transition to a circular business model. As a result, customers start utilising the new package design. The law also modifies the law to simplify recycling programmes for businesses and gives government ministers the authority to issue directives to businesses producing significant volumes of plastic. (Numata, 2022) The companies must decrease the use of 12 categories of disposable plastic goods, including cutlery and straws. (japantimes.co.jp, 2022) Retailers, eateries, and lodging establishments are required to use fewer throwaway plastic spoons and straws. (nippon.com, 2022) It promotes the circulation of plastics in a comprehensive and planned manner; the basic policy includes the implementation of two step plan for reducing single wastes of plastic. It includes the reduction of use by the service sector and retailers. The second step evolves around the methodologies the municipalities should use in the separation and collection methods. (env.go.jp, 2022)



Source for the illustration: Website of the Miyako Ecology Center

Figure 15

<https://www.weforum.org/agenda/2019/08/the-japanese-have-a-word-to-help-them-be-less-wasteful-mottainai/>

4.3. Regulation of Controlling Radioactive waste

The Law for the Regulation of Nuclear Source Material, Nuclear Fuel Material, and Reactors governs the waste generated by nuclear reactors uranium and plutonium. In contrast, the Law Concerning Prevention of Radiation Injury due to Radioisotopes, etc., governs the waste produced using radioisotopes, radiation rays, accelerators, and other nuclear technologies. The responsible authorities have been chosen, which is the established legal framework. It should be noted that in general, these regulations are premised on the assumption that radioactive wastes are generated in a controlled environment. In addition, they are handled and stored properly. (Nagasaki, 2015).

There are two categories of wastes s per volume. The first category is waste of 8,000 Bq/kg or less and the second category is waste of over 8,000 Bq/kg are the two categories into which the waste produced in the countermeasure areas as stated by the authorities. They are defined as: areas where evacuation orders are ready to be lifted, areas where residents are not allowed to live, and areas where it is anticipated that residents will have difficulties returning for a prolonged period. The former shall be treated in line with the “Trash Management and Public Cleansing Law” by regional governments or waste disposal facilities. The latter will be handled as rubbish on par with According to the Minister of Environment, trash is waste produced outside countermeasure zones with a radiation level greater than 8,000 Bq/kg. (Nagasaki, 2015)

Any waste that exceeds 8,000-100,000 Bq/kg or less will be disposed of in each prefecture, regardless of location, in a regulated repository or disposal site. For this area, the present landfill site is regarded as both a major and prospective source. When a new controlled repository or disposal site has to be established, the Japanese government (any authority including the ministry of environment) will select one or more approved places within the national boundaries in each prefecture. Additionally, the amount of waste will be reduced by burning, drying, fusing, and other techniques up until a controlled repository/disposal site is open. A temporary facility will also be built to burn any agricultural or forestry wastes that cannot be burnt in the present incinerator factory, such rice straw, pasture waste, and other items. (Nagasaki, 2015)

• It is projected that Fukushima Province would create a substantial volume of trash, combined with decontamination and highly contaminated waste with a contamination level of 100,000 Bq/kg. The contaminated soil and other decontamination waste will be kept at the temporary storage location before being transferred to the intermediate storage facility. They will be stored with garbage that has a concentration of more than 100,000 Bq/kg. Outside of Fukushima Prefecture, no waste is sent to the medium storage facility. Since it is expected that no destruction with a radioactive level of more than 100,000 Bq/kg is produced in prefectures other than Fukushima, waste from those prefectures is not thought to be included in the flows that go to the intermediate storage facility. (Nagasaki, 2015)

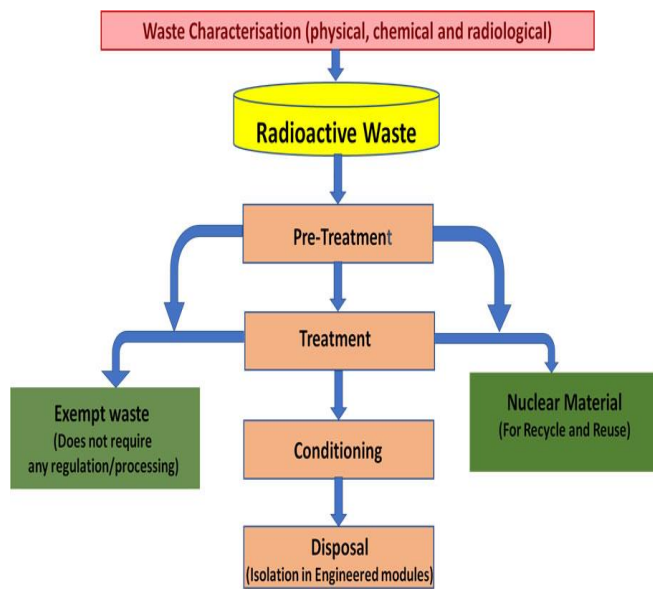


Figure 16 (diagram from India to illustrate a similar practice)

<https://www.barc.gov.in/pubaware/nw.html>

4.4. Regulation for protecting marine life:

The "Marine Pollution Control Law of JAPAN" was developed in 1970 to reduce marine pollution caused by ships. In 1976, the statute was changed to include measures for the pollution brought on by "maritime disasters" Eventually, it became the fundamental rule dealing to the "Preventing Maritime Disasters and Marine Pollution (LPMP)". The amendment was done in 1976 so that the law can be applied for the prevention of cases where a ship is

supposed to release substances like oils, hazardous liquid substances in bulk, harmful substances in packaged form, sewerage, and water into the ocean as all that are very damaging for the ocean life.

To prevent marine pollution by the waste in 1972 JAPAN adopted the London Convention for regulating and preventing marine pollution from the dumping of waste material in the ocean. The LPMP and the (Marine Pollution and Maritime Disaster) and the Disposal and Public Cleansing Law will be used for regulating pollution prevention activities.

The country of JAPAN has also adopted the "International Convention on Oil Pollution Preparedness, Response and Co-operation" in 1990 to ensure the protection for the marine environment from oil pollution (Ministry of Environment, Government of Japan, 2022).

As a part of protecting marine life, Japan has started to make huge investments in learning about the ocean through scientific research. The Japanese organisation of "The Japan Agency for Marine-Earth Science and Technology (JAMSTEC)" is one of the leading science-based organisations of the world that is engaged in deep-sea marine life as well as earth science. The organisation's objective of JAMSTEC is to develop and gather new scientific and technological knowledge that can be used better for protecting marine. For example, one of the most critical areas of research for JAMSTEC to assess how the human-generated greenhouse gases & especially the Co2 absorption by the ocean water is, make it more acidic and thus threaten the life of a large number of ocean insects as well as fishes (How Japan Is Promoting Ocean Sustainability Through Science And Startups, 2022).

Figure 16



Figure 17
<https://sevenseasmedia.org/a-deep-dive-into-japans-questionable-treatment-of-marine-life/>

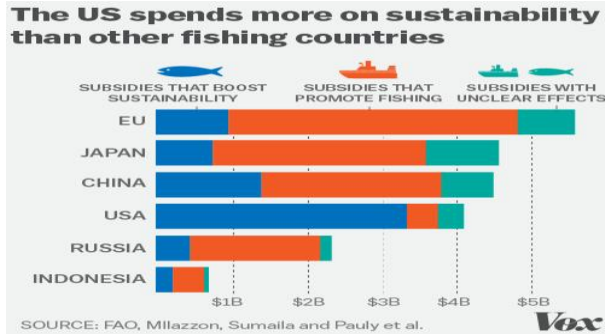


Figure 18
<https://www.vox.com/2016/3/21/11275962/fishing-subsidies-overfishing>

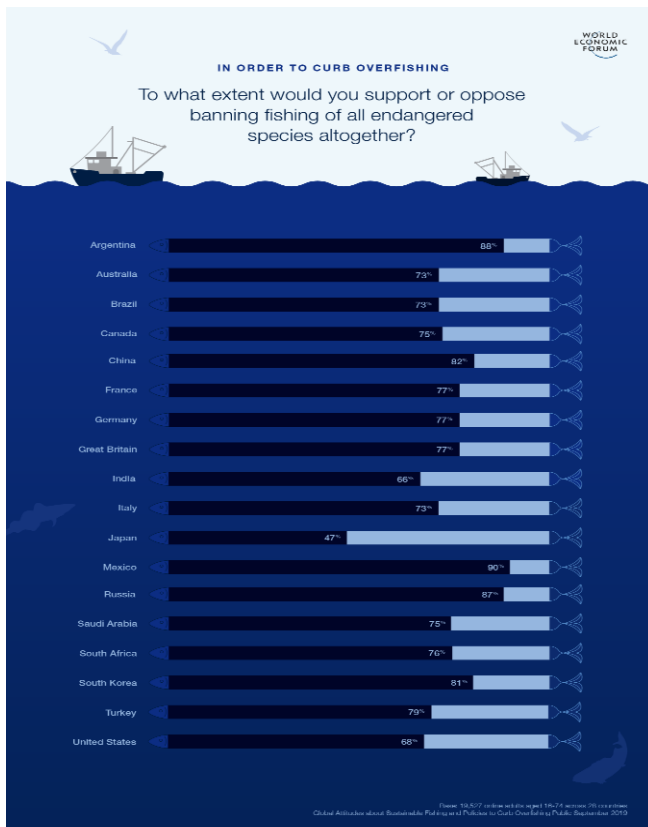


Figure 19
<https://www.weforum.org/press/2020/01/overwhelming-public-support-for-ban-on-fishing-for-endangered-species-poll-finds/>

5. Strategy of Evaluation

A look at the available laws and strategies for solid waste management it can be observed that the government is working to control the disposal of solid waste in the best possible way, and the development of the "Sound Material-Cycle Society " is one of the most positive initiate that the authority of JAPAN has taken as the society is emphasising upon the three Rs that can be identified as REDUCE, REUSE and RECYCLE. But due to some social considerations, the government is currently focusing on only REDUCE and RECYCLE, and the aspect of REUSE is not currently considered. The country of JAPAN mainly relies upon the incineration method, that is resulting in the exposure of huge amount of dioxin gases in the environment and the country of Japan has no solution to protect the environment from this air pollution that is resulting from the disposal of waste management.

The country of JAPAN is working strongly to recycle the plastic as much as possible through the act of "The Plastic Resource Circulation" for reducing, reusing, and recycling process while minimising the manufacturing of single-use plastic across the country. But it is very difficult for the nation to prevent the huge production of single use plastics that are being prepared and used in vending machines or for rapping for fish meat and vegetables and the volume of plastic that is being recycled is much lower than the volume of plastic that is being produced by the country. A large volume of single volume plastic is getting drained away to the river and oceans and badly hurting the marine life around the oceans of the country of JAPAN. The country of JAPAN claims that it is the second largest company of the world after Germany that is engaged in managing plastic through recycling. The country describes that the plastic management and recycling rate in the country is around 85%. However, the country is only disposing off 65% of plastic waste through thermal recycling. Therefore, it can also be seen that the country of JAPAN requires more stringent rules and regulation for preventing the plastic pollution (japantimes.co.jp, 2022).

A look to the radioactive waste management activates as defined by the Trash Management and Public Cleansing Law it can be observed that the government of JAPAN has set the cut off limit above which the radioactive trash will be subjected to disposal. But the country of JAPAN has no permanent solution for handling the wastewater and most of the waste waters are being kept in the temporary storage



that is not a safe option for the country as the stored water is going to penetrate and eventually is going to pollute the soil. Besides the accident of the Fukushima Daiichi that results in destroying the plant and contamination of heavy water with the ocean in huge ocean pollution. The present regulations related to radioactive waste management is not able to control such disaster in future, The policy of the authority of JAPAN to consider disposal of heavy water in ocean as the final disposal avenue has raised much of resentments across the world as such activity is going to hurt the marine life. Dilution of radioactive waste water is not an option as it does not reduce the toxic nature of the water.

The country has some basic regulations for protecting the marine life from the pollution being created by the hazardous and toxic materials created by ships or the pollution created by the dumping of the waste material. But there is little or no rule for protecting the marine life, especially the whales and fishes that are being mercilessly hunted down across the oceans souring JAPAN in the name of tradition and delicacy. The only step that the country has taken is that the country has withdrawn from the International Whaling Commission (IWC). Otherwise, there is no such option on behalf of the nation for protecting the marine life from hunting. This course of action on behalf of the country of JAPAN is questionable but the country is not ready to give much importance to that issue.

The destruction of coral reef is another major issue for the country as the acidic sea water is destroying the deep ocean coral reefs through bleaching across the oceans of JAPAN. The ocean water around JAPAN is mainly becoming acidic due to the absorption of different greenhouse gases and mainly CO₂. Therefore, it is oblivious that the solid waste relying on process of the country is not strong enough to control the emission of the greenhouse gases that is essentially required to control the bleaching and destruction of the coral reefs across the oceans.

6. Sustainability Package Proposed:

6.1. The Hatoyama initiative was created by the Prime minister Hatoyama. This initiative was meant to help developing countries to tackle climate change. Japan will provide a fund of (15 billion \$) to support other countries. We suggest that Japan should start by using the same initiative but domestically there is no point in helping others if Japan itself is struggling. A small analogy to support my claim, when an emergency is bound to happen in an aircraft. A person should help him/her self-first then help others in wearing their breath masks. That amount of fund will allow the municipalities in Japan to build new

units of recycling or even incineration units. Japan could use these funds to study the use of other forms of electricity generators instead of nuclear, as stated above, emergencies are bound to occur.

6.2. Fish-farming solution: Folk (2018) had stated that fish farming will have a minor impact to the environment. However, it can solve the issue of overfishing. The Japanese rely primarily on fish for their daily food intake. Japan is accused of over-fishing. Commercial business can benefit if subsidies can be provided to entities and establishments that can provide such services. Allowing the wild fish to rebound back to the ocean. Although if these practices are done without proper health and safety supervision, diseases might spread in fish tanks as they need to be maintained.

6.3. Sustainability starts in the classroom is another solution. The Japanese culture still believes in only 2Rs. Reduce and recycle. The idea of reusing is not accepted in Japan for sanitary reasons. Due to wrapped food in vending machines. We will call it as the Japanese culture in serving pre-prepared food. From the analysis prepared by the group, we believe that this issue was raised due to education from school. The Japanese might have been taught not to reuse materials thus causing solid waste problems. Folk (2021) have emphasised that sustainability is taught at a young age in school. If the 3Rs or even 4Rs were embedded in their education system, the future of Japan will be in the hands of environmentally aware policy makers and sustainable communities.

6.4. Introducing laws and regulations regarding carbon and pollution tax. After the education solution. The public must acknowledge that all unsustainable solutions must be punishable by law. This will eradicate the illegal dumping of solid wastes. If the laws are not strict, fewer corporations will take the laws under consideration. Awareness is a crucial step after education.

6.5. The introduction of artificial coral reefs: The. Main purpose of building a huge structure under water is to preserve the natural reefs and it contributes positively to increasing fish popular which was previously affected by over-fishing. Holland (2021) have stated that the only obstacles are cost and regulations. As previously mentioned, Japan's sustainable framework is weak and doesn't support much practices.

6.6. Using technology to detect illegal fishing. Companies like unseen labs do provide services by



tracking ocean traffic. To detect illegal fishing activities and piracy. Such monitoring will assist in identifying the violators. By time, the public will be aware of such technologies and will help in reducing illegal practices.

6.7. Investment in Research and Design of environment conserving tools. Policy against not using absorbent oil spills. It might take time to push such policy, but Research and design can study the usage of such technologies. Noaa(2021) has stated that it can be used to stop oil spills in small vessel engines. I would suggest deeply study the mechanics of such tools and its possible big vessels can use them.

7. Conclusion & Recommendation: (Sustainability part)

7.1. Conclusion

The country of Japan is working in the different fields for controlling pollution which includes the fields like solid waste management, plastic pollution prevention, managing the radioactive waste and protecting the marine life. The country is having the strongest pollution control rules and regulations in the field of solid waste management and controlling of the plastic pollution.

However, the country is having the weakest regulatory framework with respect to the protection of the marine life and hunting of the marine species in JAPAN.

8. Introduction to the Japanese economy

For a developed country, it is not only important to excel their economy and their overall GDP, but also to enhance their rate of sustainability within the sector. Sustainable trends have reportedly emerged after the threat of globalization occurred, which led to the adoption of the green methods in economy by majority of the countries. Among those nations, Japan is one of the leading one, with an economy so well established and its population so high in employment, literacy, and ethnicity, including its several creative approaches towards sustainable economics, which the study would be centralizing its focus upon.

Japan is infamous generally for its diverse population, which indicates its ethnic homogeneity. Possessing such ethnic homogeneity only highlights the fact that the East Asian country thoroughly respects each race and culture. With that being stated, Japan must stable its economic grounds as to serve its vast and diverse population. Currently, the country of Japan seemingly attains a

population of more than 125 million, which leads to the fact that the country surely operates on several economical operations which aids both the citizens of Japan, and also obeys to its core of sustainability (Baten, 2016). As per a report relevant to the current discussion, it was highlighted that Japan's economy is presently the third largest on a worldwide scale, since the country is extremely developed while being extensively small (Ogunmakinde, 2019). Developed nations are often termed as the ones responsible for the environmental changes, which is why countries, such as Japan seeks ways to fulfil their job of adopting sustainability within their economy. Other than possessing a third largest economy, Japan also serves the globe as one of the leading contributors as trader, universal capital market partaker, foreign direct stakeholder, and the infamous stalwart devotee of the open international ecosystem. Considering the stated, one can decipher the number of contributions that the country of Japan gives on a global scale. To mention it in a simple way, Japan experienced a great economic loss in the year of 2014, mainly due to the global financial crisis regarding the banking businesses, and partially due to the increasing amount of loans that the banking firms of Japan provided for its stakeholders to invest in prospective companies. Japan's GDP in 2014 shrank to almost third quarter, which highlighted the fact that the country generated less capital in that year, and the year following it (Shirai, 2020). However, through the hefty surge in customer spending, the effected country surfaced and eventually recovered from its tragic downfall of GDP. If simplified, it can be stated that Japan's most vital and contributing factor to the economy is its creative financial approaches. The central banks in Japan cut down interest rates which resulted into a sudden growth of the economy. Gradually, the Japanese economy healed and improved. A report claimed that the increase in total fiscal rate of Japan's gross GDP in 2016 was an approximate of 1.3%, which was the same as the last year of 2015. The growth was due to the excessive increase in the exports and the rapid consumption and investment that the Japanese stakeholders capitalized (Fukao et al., 2021). Furthermore, after years of economical disasters and downfalls, Japan's economy proficiently recovered in the year of 2017, when the nation encountered no labour shortages from any given industry or organization. With a healthy amount of workforce operating, there was a high rate of labour productivity, and the tasks were allocated in a justified manner (Patrick, 2021). Moreover, being the developed nation Japan, is, the country approached several sustainable practices in its economics, which enhanced the state of economy further.



8.1 Japan's sustainable economics approaches

To settle sustainability within its economic grounds, Japan has sought various approaches to fulfil such initiatives. Firstly, sustainable economics in Japan initially began from its labour market. It is vital to note that around 80% of the Japanese population is literate, with 65.6 million of them being employed. High rate of literacy and equally increasing rate of employment with a developed country only leads the nation to adopt to several environmentally friendly ways to financial operations (Zhao, 2022). A research study indicated the fact that due to the increasing number in the Japan's labour market, the nation fulfilled its sustainability approach. In the year of 2017, it was reported that various women and older individuals in the country started approaching employment opportunities, which led to the immense growth of sustainability within the country (Flath, 2022). Furthermore, due to a healthy number of workers, Japan segmented its labour force, while also diminishing its labour shortages problems. A country with almost all its population working tends to improve its economy quite vigorously. Additionally, introduction of sustainable practices in the foreign trade also enhanced the Japanese economy. In the recovering era of 2016, Japan reportedly increased the balance of its payments by 3.8% of its GDP, because the total fiscal exports were about 13.1% in the stated year. Such enhancement led the country to reserve a total of 1,230 billion USD through an effective foreign trade (Miyamoto, 2016). This indicated that Japan has succeeded in its approach to sustainable economics. In addition to the mentioned, Japan, in the year of 2016, initiated programs which preserved energy, mainly because the country utilized fossil fuels from the import for the generation of energy. Sustainability in the field brought energy conservation in the country, along with the introduction of new nuclear power plants (Chen and Wu, 2017).

8.2 Conclusion (Economic Part)

In conclusion of the research, due to the expansion of the GDP and the economy of Japan in 2016, the country willingly adapted to its sustainable approaches since it enhanced the state of the fiscal economy by mass. The research indicated that Japan, after a great economical loss in 2014 because of the excessive loans and global banking crisis, encountered a rather positive surge in its economy due to several contributing factors. The literate and employed population brought the change in the economy, including its labour segmentation, newer nuclear plants and efficient foreign trade, while obeying the grounds of sustainability.

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