Sustainable Recycling Economy

Plastic Waste Management: The Environmental & Economic Implications

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Synopsis

The ensuing rapid growth in plastics production is extraordinary, surpassing most other man-made materials, apart from steel and cement.

Plastics are amongst the most versatile and commonly used materials in the world! They simplify and support modern life; they ensure food, drink, and medicine safety by providing packaging materials that help store and transport them. However, due to the profound impact plastics have had in the last 100 years of human history, developing an efficient method of plastic waste management is essential.

The attraction to plastics and the undeniable behavior of over-consumption, discarding, and littering of these plastics has led to pollution in our lives, which has become a major contributor to global warming.

In this report, we explore plastic waste management, the environmental and economic implications of a sustainable recycling economy around the world, and in Nigeria.

Recyclable Plastic

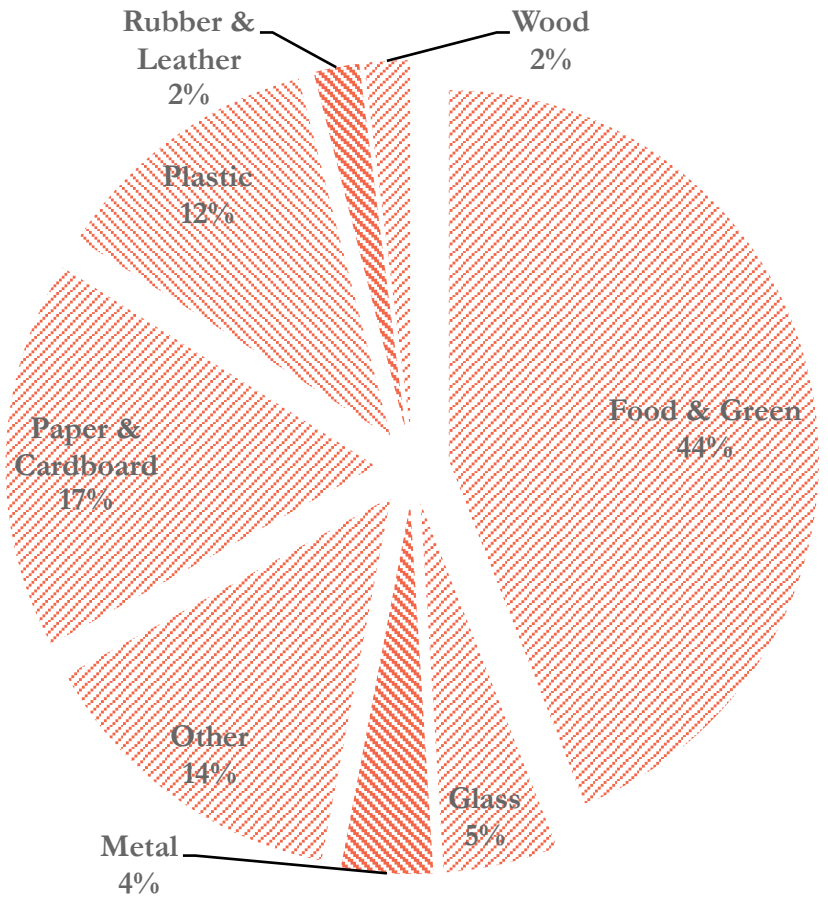
Plastic Pollution Overview

According to Britannica, 'plastic pollution can be referred to as the accumulation in the environment of synthetic plastic products to the extent where they create problems for wildlife, their habitats, and the human population.' Plastic pollution, in simpler terms, is the buildup of plastic waste in an area that has begun to impact life negatively.

Plastics' largest market is packaging, an application whose growth was accelerated by a global shift from reusable to single-use packaging material. Globally, half of the plastic products manufactured are designed to be single-use. Every minute, 1 million plastic bottles are purchased, and every year; about 5 trillion single-use plastic bags are used globally.

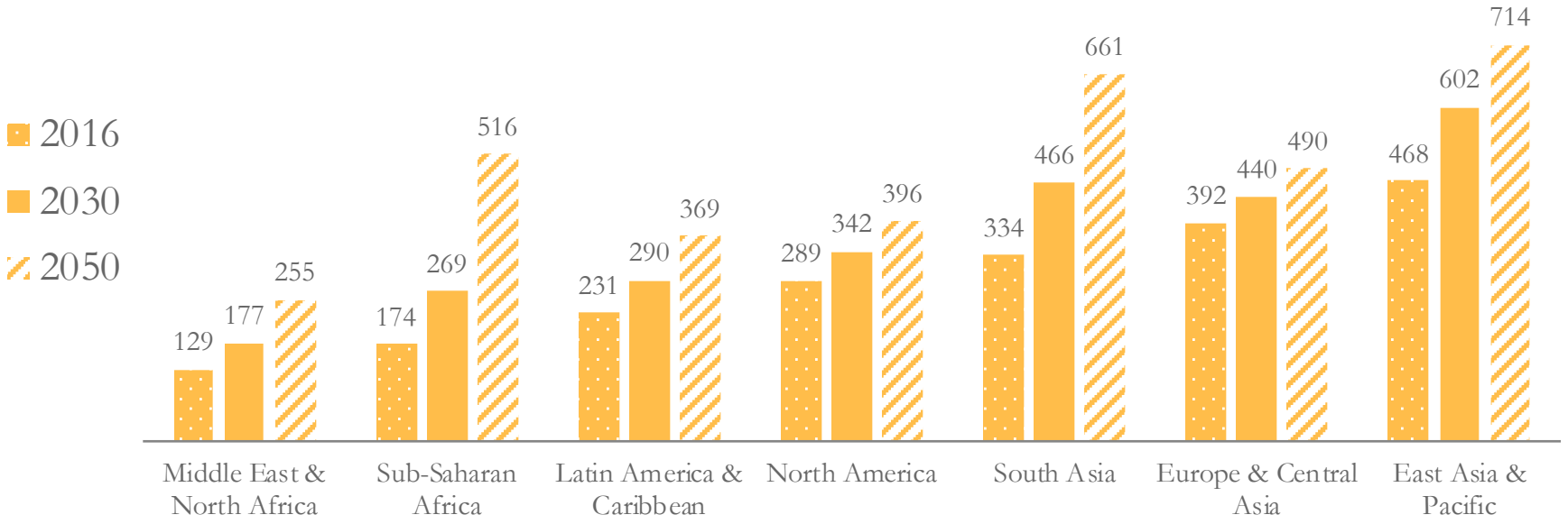
As a result of the growth in plastic packaging, the share of plastics in municipal solid waste has increased from less than 1% in 1960 to more than 10% by 2005 in middle and high-income countries.

Global Municipal Waste Composition (2016)



According to The World Bank, globally, as of 2016, about 2 Billion tons of waste was being generated, and about 12% of this waste was plastics.

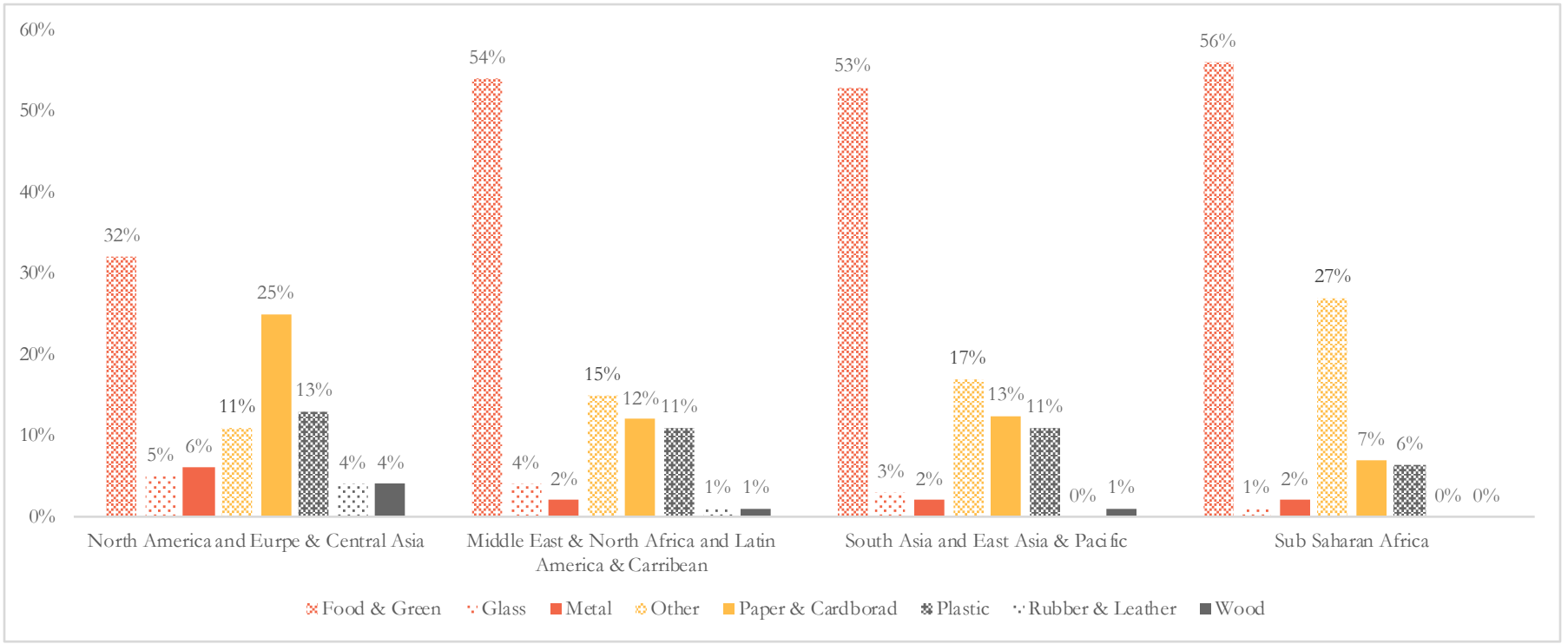
Projected Waste Generation, by Region (millions of tons/year)



Annually, East Asia & Pacific, Europe & Central Asia, and South Asia are the biggest contributors to the global municipal waste generated; with a combined 1.2 Billion tons of waste generated.

By 2050 however, Sub Saharan Africa will replace Europe & Central Asia as one of the biggest contributors to the global municipal waste generators.

Waste Composition, by Region



North America and Europe & Central Asia, generate more waste that can be recycled – paper, cardboard, plastic, metal, glass, and wood, while other regions contribute mostly organic waste – food and green waste.

However, as the middle class grows and urbanization increases in these other regions, we expect an increase in waste that can be recycled.

Waste Composition, by Region

Although paper, metal, and plastic can be recycled, producing them and disposing of them causes more harm than good to the environment.

When paper is manufactured, chlorine-based bleaches are used, which leads to the release of toxic materials in the airway, soil, and water.

As for metal, toxic fumes such as formaldehyde, isocyanates, and phosgene are released to the environment causing respiratory, eyes, and organ damage.

And for plastics, they are currently disposed of incorrectly (in landfills, gutters, rivers), and as such, they end up clogging landfills, blocking drains, polluting waterways, and contributing to biodiversity loss. Sometimes they are also burned which releases poisonous chemicals into the air, causing respiratory problems for humans and animals.

Unfortunately, food & green wastes are not disposed of correctly either; about 40% of waste is currently disposed of in landfills around the world. When deposited in landfills, food & green wastes are left to decompose with the aid of living organisms which then produces toxic methane gas which is emitted into the atmosphere.

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Waste Composition, by Region

On Wednesday, March 14th, 2018, methane gas produced at the Olusosun Dumpsite in Ojota area of Lagos State, Nigeria, combusted and created an explosion that destroyed vehicles and emitted thick dark smoke that overshadowed the area for weeks. This is an example of what happens when food & green wastes aren't disposed of properly.

Fortunately, glass and wood are some of the most environmentally friendly materials. For one, wood is produced from trees and trees are a naturally renewable resource as they can be regrown.

And for glass, most of the glass products on the market are already recycled glass, therefore, making it environmentally friendly. Since glass does not degrade during the recycling process, it can be recycled many times.

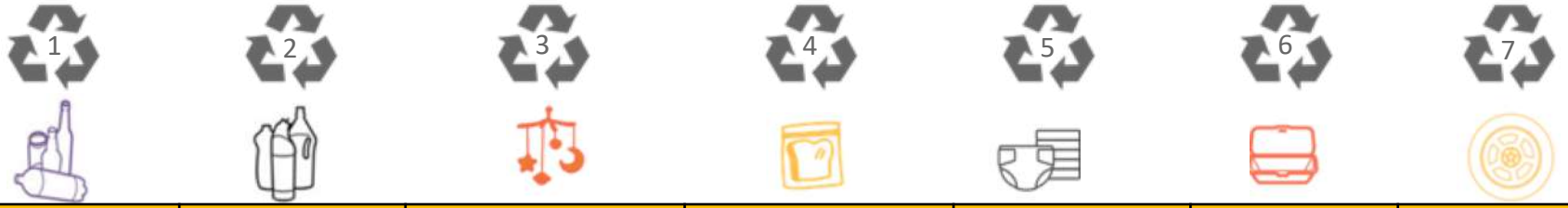
Waste Composition, by Region

Plastic pollution is one of the most pressing environmental issues around the world. More visible in developing nations where waste collection systems are non-existent or inefficient.

However, governments around the world are starting to realize the danger of single-use plastics and are running awareness campaigns, recycling programs, introducing levies, and outright banning some of these products.

Interestingly, Africa has the most countries that have banned the production and use of plastic single-use bags; which is the most effective solution.

Types of Plastics

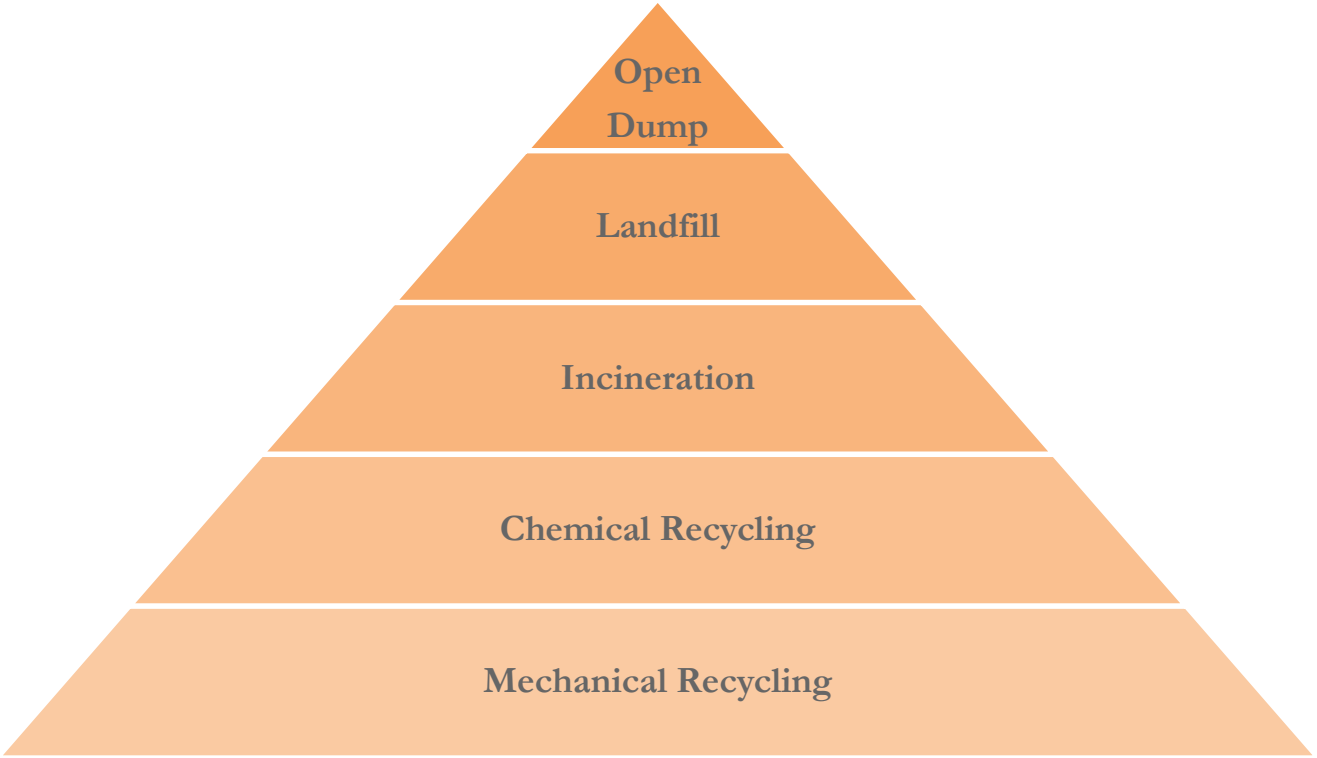


PET	HDPE	PVC	LDPE	PP	PS	OTHER
Most commonly used plastic	Safest form of plastic	Contains many toxins	Considered less toxic and safe to use	Tough and lightweight plastic	Inexpensive plastic with a variety of uses	All bisphenol, polycarbonate and other plastics
Single-use. Repeated use increases the risk of bacterial growth	Reusable. Not affected by extreme weather.	They are soft and flexible plastics that do not allow sunlight	Reusable. Not always recyclable	Reusable. Serves as a barrier against moisture, and heat	Lightweight. Also affects health	Plastic can contaminate items stored in it
Products: mineral, water, dishwashing soap, jars	Products: plastic tables, laundry detergent, and, bleach containers	Products: plastic pipes, plastic food wrapping, children's toys, pets toys, and teething rings	Products: bread bags, paper towel and tissue overwrap, trash bags, grocery bags	Products: cereal bags, diapers, straws, plastic bottle tops, pails, and buckets	Products: Styrofoam drinking cups and food containers	Products: baby bottles, sippy cups, nylon, and car parts
They are mechanically recycled	Mechanically and chemically recycled	They are mostly not recycled	They are mostly recycled	They are commonly recycled	Not commonly recycled	Mostly not recycled
Pet bottles, polyester fiber carpets and clothing	Recycled to make pipes, flower pots	Recycled to carpet backings, flooring, binders	Recycled to trash bags, composite bins	Reprocessed to auto parts, speed bumps, bins, trays	Reprocessed to picture frames, hangers, toys	Reprocessed to electronic parts, and auto parts

The types of plastics above can be recycled either mechanically or chemically; however, PET, HDPE, and PP are the most recycled globally because of their worth. For example in the United Kingdom, as of August 2018, a ton of HDPE was worth 335 Pounds (most expensive plastic on the market), Clear and Light Blue PET was worth 145 Pounds, and Colour HDPE was worth 110 Pounds

Disposal of Plastics

How exactly should this inexpensive, mass-produced product with a vast distribution network be properly disposed of? There are currently 5 ways plastic waste is disposed of



Disposal of Plastics

1) **Open Dump** – An open dump is the worst way to dispose of plastic waste! It is a place where plastic waste is disposed of that does not take into consideration the environment. The refuse is dumped on a piece of land; as such, the wind blows plastic waste into waterways and gutters. For the plastic waste that doesn't blow away, when it decomposes, pollutants are leaked into the air and soil.

2) **Landfill** – Plastic Waste can be disposed of in landfills; however, the challenge lies when the landfill is not properly managed. Lack of a controlled landfill with gas collection leads to the same outcomes as an Open Dump – the wind blows plastic waste into waterways and gutters, and pollutants are leaked into the air and soil.

3) **Incineration** – Is the burning of plastics and most times the output is used to create energy. Plastic is made from hydrocarbon. It is more 'energy-dense than coal', as such many argue that incineration for energy is one of the best ways to rid the plastic waste problem. But whether burning to use as energy or burning as a way to dispose of plastics, incineration, emits toxic pollutants such as dioxins, acid gases, and heavy metals.

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Disposal of Plastics

4) **Chemical Recycling** – With chemical recycling, plastic waste can be transformed into monomer molecules which can be used to create the same type of plastic. Plastic waste can also be converted into fossil fuels. Although it uses a process of burning, this form of chemical recycling (Pyrolysis), decomposes the waste in an oxygen-free environment, therefore emitting very low levels of carbon dioxide. The process creates 80% oil and 15% gas which can be fed into refineries.
5) **Mechanical Recycling** – This is the most effective way to deal with plastic waste! When the term recycling is used, it typically refers to mechanical recycling. Therefore, recycling would be used to discuss mechanical recycling henceforth. Recycling is the process of converting plastic waste material into new materials. The process of recycling does not emit toxic pollutants, and it helps lower greenhouse gas.

Disposal of Plastics

How has the global plastic waste disposal method changed over time?

- Before 1980, recycling and incineration of plastic were negligible; 100% of plastic waste was discarded.
- In 1980 incineration and 1990 recycling, rates started to increase on average by about 0.7% per year.
- In 2015, an estimated 55 percent of global plastic waste was discarded, 25 percent was incinerated, and 20 percent recycled.

As plastic is one of the world's most used materials, and with the rapid increase in population within urban cities, there is a need for efficient and modern technology for the management of plastic wastes. Among all 5 options, recycling of waste plastics is one of the most efficient ways to rid plastic waste without creating environmental pollution.

Process of Plastics Recycling

Plastic Recycling is the process of converting plastic waste material into new materials. The process of recycling does not emit toxic pollutants and helps lower greenhouse gas. So how exactly is plastic recycled? Plastic recycling is broken up into a few distinct steps. Generally, these steps remain the same for most types of recycling facilities and are carried out globally.

Step 1: Collection – The first step is the plastic collection. This step is reliant upon businesses, restaurants, households, and the public to collate their plastic waste separately.

Step 2: Sorting – After plastics are collected, they are transported to a sorting station. Here the plastics are usually sorted based on a few common characteristics such as the type of plastic, color of plastic, or even how it was made. This is important because different types of plastics must be processed in different ways, and some recycling facilities are only capable of recycling specific types of plastic.

Step 3: Resizing – This is the third step in the recycling process; at this stage, the recyclables are broken down into granulates and compounds. Hence, Resizing consists of shredding or granulating plastic waste into small particles. This increases the surface area of the plastic, making it easier to process, reshape, and transport.

Process of Plastics Recycling

Step 4: Identification and Separation of Plastics – The identification and separation of plastic is when the now small plastic particles are tested to determine their quality and class. The first quality tested is density; done by floating the particles in a large tank of water. Particles less dense than water will float and denser particles will sink. Next, their air classification is determined; air classification is how thick or thin a particle is. This is done by dropping the particles into a small wind tunnel. The smaller pieces will fly higher up the tunnel, and bigger ones will remain lower. Plastics are also tested for their melting point and color; these are determined by collecting and analyzing samples from each batch of plastic particles.

Step 5: Compounding – The final step in the recycling process is often considered the most exciting because it is when the plastic particles are made into recycled materials. Compounding is when the small particles are smashed and melted together into plastic pellets which are used in the production of other plastic products.

Environment and Economic Implications

Country Case Studies

Apart from selling the recycled product, plastic recycling creates jobs and impacts communities and the environment. In Germany, Mexico, Japan, South Korea, and South Africa for example, plastic recycling has had an impact on the economy; job opportunities and wealth creation.





Environment and Economic Implications

Germany

Germany has been very successful in the fight against growing waste, as the country has created strict rules in the management of their wastes as well as the separation of wastes into different bins. There's a blue bin for paper, a brown or green bin for biodegradables, a yellow one for plastic, and a black one for the rest. Sixty percent of municipal, as well as commercial waste, is recycled, and 90% of construction and demolition waste is also recycled.

Environment: the Green Dot system in Germany has been cited as one of the best recycling initiatives in the world. Manufacturers pay for the Green Dot on their packaging material and the more packaging material used, the more the manufacturers have to pay. Essentially, the Green Dot system is meant to reduce the quantity of packaging material manufacturers use. And it does just that! Less paper, metal, and thinner glass is now commonly used. Reducing the amount of packaging material used reduces greenhouse emissions. Between 1990 and 2018, Germany's greenhouse gas emission reduced by 31%.

Economy: With packaging material that has already been manufactured and bought, the process of disposal and recycling has a financial impact. The waste management industry has provided employment opportunities to over 200,000 people in Germany. There are also about 3,000 companies within the industry that have an annual turnover of about 40 Billion Euros.

Environment and Economic Implications

Mexico

Mexico is one of the most recognized countries in the world for its high rate of recycling products made from polyethylene terephthalate (PET). Its 17% overall recycling rate shows that there is still so much recycling needed with other types of recyclables.

Environmental: The Mexican industry generates a good amount of PE, PP, PS, and PVC, which mostly ends up in landfills. However, it is a different story with PET; Mexico is the world's second-largest PET consumer and home of Petstar, the world's largest PET recycling plant. Small and medium-sized recyclers manufacture most of Mexico's exports of recycled PET and other resins. Large recyclers produce for their consumption as their way to assure compliance with health and environmental standards.

Economy: The New Mexican governmental directives that industries include recycling activities as part of their corporate social responsibility programs. The value chain of Mexico's recycling industry has 2,767 establishments with approximately 95% considered small or medium size, both in capacity and contribution to national production.

Environment and Economic Implications

Japan

In Japan, there is a high influx of PET bottles; in 2017, 22.7 Billion Pet Bottles were shipped into the country, which accounts for about 180 bottles per person.

Environment: PET bottles are lighter, less fragile, and easier to carry around in comparison to glass bottles. The Japanese understand the benefits of PET bottles; however, to protect the environment, they have designed Acts that govern the manufacturing materials and recycling of these bottles. PET bottles are manufactured using plant-based materials and are manufactured using molding and filling technologies to ensure they are thin and easier to recycle. As of 2017, 84.8% of all PET bottles are recycled in Japan, which makes Japan among the highest recyclers of PET bottles in the world.

Economy: Japan has been exploiting waste as a profitable resource, through the creating of a circular economy whereby laws are being passed that enable them to resolve the different challenges involved in waste management. There has been the establishment of 23,045 industrial and general waste disposal businesses throughout Japan. Japanese recycling plants generate a market value of approximately 39 Trillion Yen and also employ about 990,000 people.

Environment and Economic Implications

South Korea

South Korea has one of the waste management programs in the world; it is considered a G20 superpower that recycles over half of domestic waste.

Environment: In 2003, South Korea revised its waste system policy to ensure that separation of waste begins before disposal, and failure to comply leads to hefty fines. This ensured the effective disposal of different types of waste. With this system, South Korea can recycle about 60% of all its waste annually. Understanding the impact of effective waste management on the environment, 2% of the South Korean GDP is invested in a Green Growth Plan.

Economy: The circular economy is one that minimizes wastes and makes the most out of waste. This brought about the number of producers with recycling businesses that have grown over time. The total amount of recycled waste increased by more than 60% in 10 years; from 938 000 tons in 2002 to 1.52 Million tons in 2012. This has led to KRW 3.05 Billion revenue from selling the recycled materials, as well as the creation of an estimated 9,769 jobs.

Environment and Economic Implications

South Africa

Currently, in South Africa, 90% of all waste ends up in landfills, which is a looming crisis.

Environment: The South African government has begun awareness programs on the environmental and ethical impact of recycling. Households are encouraged to separate their wastes; however, most households do not because they believe it will be sorted at the refuse site - a belief commonly held by Nigerians as well. For recycling to work in South Africa, recyclable waste is obtained from landfills and other post-consumer sources. Unfortunately, because landfill waste contains different materials, plastic waste is usually contaminated, leading to high levels of wasted recyclable waste. If separation at the source can be enforced, they reduce the amount of waste in landfills, increase their recycling rate and reduce their plastic manufacturing rate. In 2017, South Africa recycled about 335,000 tons of plastics, giving them a recycling rate of 43% for all plastics.

Economy: In 2017 alone, over 5,000 people were employed within the waste management industry, and over 52,000 people received an income within the industry. The procurement of recyclable materials injected over 400 Million Rand into the South African economy.

Plastic Recycling: Focus on Nigeria

Let's bring it home! What is going on in the Plastic Recycling Industry in Nigeria!

As the human population continues to increase, the quantity of solid wastes generation also increases. With the rapid increase in population within urban cities and the growing middle class, there is a need for efficient and modern technology for the management of wastes.

The main reasons for recycling plastic are to reduce the high rates of plastic pollution, reduce the amount of pressure we put on virgin materials to produce brand new plastic products, and reduce the toxins that are emitted when we produce new plastic products. In short, we are trying to conserve resources and our environment. If we do not, the plastic waste, as well as other waste flowing into our oceans, will increase pollution and impact coastal economies.

The African Union has announced that African "cities will be recycling at least 50% of the waste they generate" by 2023. An ambitious but achievable goal only if citizens separate waste at the point of collection, compost their organic waste, recycle their recyclable waste, and reuse waste.

Plastic Recycling: Focus on Nigeria

The Nigerian plastics and packaging sector has been in existence since the 1960s and started with about 50 plastics companies. Over time, this sector has grown in size, to over 3,000 companies, and has become increasingly sophisticated with new technologies introduced to the market. The plastics and packaging sector comprises of different subsectors, which include plastics, plastics flexible packaging, and polythene bags.

The plastics and packaging sector relies on the upstream petrochemical sector as well as imports to provide it with sufficient raw material inputs. About 72% of all plastic raw material inputs are imported into Nigeria from the Middle East, Europe, and Asia; making Nigeria the 3rd largest importer of plastic raw materials in the world

Plastic Recycling: Focus on Nigeria

Analysts suggest that Lagos is the largest producer of waste and plastic waste in Nigeria. Over 3,000 tons of waste is generated within Ogun State on daily, while in Lagos, over 15,000 tons of waste is generated on daily. There is a high likelihood for these figures to increase as population sizes in these states are increasing.

There are about 15,000 tons of waste generated daily in Lagos, and about 2,250 tons of waste is plastic waste which can be recycled; suggesting that in a year, Lagos generates 821,250 tons of plastic waste.

Unfortunately, less than 10% of this waste is currently being recycled.

Let's identify the market players within plastic recycling in an attempt to get some clarity on why less than 10% of plastic is recycled in Lagos.

Plastic Recycling: Focus on Nigeria

Competitive Landscape

Plastic Recycling is an extremely lucrative business in Nigeria. It provides revenue and investment generation opportunities; it creates jobs and sustains the environment. Companies like the below are tapping into this lucrative market

CHANJA DATTI™
TRANSFORMING WASTE INTO VALUE

GREENHILL RECYCLING

RecyclePoints

wecyclers

VICFOLD RECYCLERS
Towards a Sustainable GREEN Environment

Waste-Point
...solution point for waste issues

GIVO
GARBAGE IN VALUE OUT

VERSA Research

Chanja Datti Co. Limited

Chanja Datti is a female-owned business, committed to transforming waste into value. To ensure proper waste management and to tackle pollution in Abuja, Chanja Datti focuses on the collection, sorting, and resizing of waste. After the waste has been resized, they are sold to manufacturers to turn them into recycled products. Chanja Datti collects a variety of recyclable waste such as cans, papers, pet bottles, glass bottles, tires, and electronics.

They empower disadvantaged women and youth by creating micro-entrepreneurship jobs for them as collectors and sorters. When women and youths bring in recyclables, they are rewarded with points that can be converted for phone top-up, bill payments, shopping vouchers, or cash.

Three Key Features:

- They implement Sustainable Development Goals that are aligned with responsible consumption and production, tackling climate change, promoting clean water and sanitation, ending extreme poverty, fighting inequalities
- They conduct enlightenment and awareness campaigns focusing on the 3R's of recycling (Reduce, Reuse, and Recycle)
- They provide clean up services for events and recyclables are collected from the consumption site

Strength: Using Fets Wallet, they provide the women and youths with points for bringing in recyclable materials. With this, they can increase financial inclusivity among these

informal, mostly unbanked, collectors and sorters.

Greenhill Recycling

Greenhill Recycling is a social enterprise that creates opportunities for people living in low-income areas in Lagos. Greenhill helps them create value from their daily-generated waste by providing them with points for their waste which can be converted for bill payments, groceries, and cash gifts. Greenhill collects recyclables such as plastic containers, aluminium cans, cartons, water sachets, and office paper. They sort these waste, resize them, separate them, and compound them.

Three Key Features:

- Greenhill collects recyclables from households, schools, and corporate organizations
- They organize rallies and clean-up activities to enlighten and educate the public
- They teach primary and secondary school students how to repurpose waste into valuable products

Strength: They created a Bagit campaign, whereby they provided bags for every household where they can neatly pack their different wastes in a branded collection bag which helps and enables the sorters sort with ease.

Recycle Points

RecyclePoints

Recycle Points empowers disadvantaged individuals in low-income areas to create values from their waste. They send these individuals to registered households to collect their recyclables such as pure water sachets, pet plastic bottles, used beverage cans, glass bottles, old newspapers, and brown corrugated cartons. These recyclables are collected, sorted, and then sold to recycling plants. Registered households are rewarded with points that can be converted to household items or cash.

Three Key Features:

- They offer different recycling initiatives; targeted at individuals, corporates, and academic establishments
- They go to households to pick up the waste and educate households on the importance of the separation of waste at the point of consumption which reduces the likelihood of contamination or their recyclables
- They go to events as a waste management crew to pick wastes for recycling

Strength: They work in partnership with Lagos State Waste Management Authority which gives them a more extensive coverage.

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We-Cyclers

We-Cyclers is on the mission to bring forth environmental social change by empowering people in low-income communities to capture value from their waste. We-Cyclers also offers waste collection and recycling services to the Lagos informal settlements, where an estimated 66% of Lagosian live. As a part of this process, residents are offered an incentive for collecting their household waste which is picked up for free by We-Cyclers. These incentives are given to them for every kilogram recycled, via points sent by SMS. These points are then redeemable against goods they value, such as airtime or basic food items. We-Cyclers collect plastic waste, sorts them, and then sell these recyclables to recycling plants.

Three Key Features:

- The point rewards are funded in partnership with Coca Cola and GlaxoSmithKline
- They have over 6,500 households on their incentive scheme for their wastes; as such, they have stopped registering more households
- They are currently running a franchise model

Strength: Due to the difficulty in collecting wastes from the streets of Lagos, they then partnered with Lagos Waste Management Authority (LAWMA) this, therefore, has made it easy for them to have access to more recyclables.

Vicfold Recyclers & Renewables

Vicfold Recyclers is an incentive-based recycling social enterprise engaged in transforming waste to value through recycling and also empowering unemployed women and youths. Hence, they encourage national recycling by providing rewards for every waste deposited to them by post-consumers. Their recycling service is adapted to the needs of inhabitants in formal and informal settlements, thereby contributing to better management of urban waste in Kwara State. They collect, sort, and then sell to a recycling plant in Akure that separates and compounds.

Three Key Features:

- Rather than points system, they provide each individual who brings their recyclables an average of 5,000 Naira monthly
- They provide advocacy seminars in communities on the role of recycling in combating global warming
- They collect their waste mainly from dumpsites and transform dumpsites into recycling parks.

Pearl Recycling

Pearl Recycling is a waste re-modeling company; they manufacture household furniture and decorative items from various forms of solid wastes, including tires, bottles, newspapers, magazines, straws, plastic cutleries, wood, unused CD tapes, sea-shells.

Three Key Features:

- They train youths on waste management and equip them with the necessary resources to start their waste management companies
- They provide consultation services on waste management practices
- Pearl Recycling is empowering people by providing them with incentives for their waste

Strength: They target the vulnerable and poor who can't afford expensive furniture in other to provide them with affordable furniture made from municipal waste.

Waste-Point

Waste-Point is a franchisee under the Lagos Waste Management Authority (LAWMA) to collect municipal solid waste from household and commercial properties in Lagos State. They pick out the recyclables, sort them, separate them, and compound them.

Three Key Features:

- They also sell or loan out modern waste management trucks
- They collaborate with the government at all levels in providing prompt and efficient waste management services
- They currently provide services outside of Lagos State.

Garbage In Value Out (GIVO)

In other to improve plastic waste collection, GIVO provides an automated end to end recycling process. They engage in the collection, sorting, resizing, identification, separation and compounding of recyclables. They use the output to produce consumer and industrial products and they also sell the output to other companies.

Three key features:

- They provide a modular collection and manufacturing system with franchising opportunities
- The entire process of collection to selling of output is digitalized and automated
- Their recycling machinery is operated by solar

Strength: This digitalized process creates a unique opportunity for them where they have data that can be used to optimize their processes as well as that of the industry.

Plastic Sustainable Recycling Economy Nigeria

Let's look at the cost of running a plastic recycling business in Nigeria and the possible profit that can be made!

The capital needed to run a full end to end (collection through to compounding) plastic recycling company is high; it will cost an estimated 25 Million Naira. However, companies do not have to provide the full end to end solution; they can focus on certain steps of the process – as we have seen with some of the players above.

Step 1: Collection – At the collection stage, the major cost will be transportation costs going to different locations to pick up the plastic waste. Some companies have a storage center where they encourage people to bring plastic waste to and they pay them for the waste. Unsorted plastic (straight after collection) goes for about 25 Naira per kg on the market. However, you need to take into consideration your transportation costs, costs of storage center where plastic waste is stored, and cost for incentivizing deposit of plastic waste.

Plastic Sustainable Recycling Economy Nigeria

Step 2: Sorting — After collection, the plastic is sorted. Sorted plastic waste goes for about 30 Naira per kg. At this stage, the major cost is operations and storage costs; the cost of the place where sorting will take place, the cost for manpower who will sort and also where you will store the sorted plastic waste.

After sorting, you can bale the plastic waste (compress plastic to reduce to a smaller size), so it is easier to transport to the site of processing. Baled plastic waste is worth more, and it costs about 65 Naira per kg. However, it will cost more to bale as there is a machine that is used for baling the waste. You also have to think of where the machine will be placed, the warehouse costs attached to it, and the transportation costs of sending baled plastic waste to off-takers.

Step 3: Resizing — At this step, the plastic waste (either baled or not, as long as it has been sorted) is shredded or granulated. Shredded or granulated plastic is worth about 100-120 Naira per kg. The main cost is getting a machine to shred or granulate, ensuring there is a place for the machine to be stored, the costs attached to it and the transportation costs of sending shredded or granulated plastic waste to off-takers.

Plastic Sustainable Recycling Economy Nigeria

Step 4: Identification and Separation of Plastics – After shredding or granulating, the next step is to wash and bale the plastic waste. After washing and balling, the worth increases to 140-170 Naira per kg.

Step 5: Compounding – At this final stage, the shredded or granulated plastic is smashed and melted together into plastic pellets where it is used to produce other products.

Plastic Sustainable Recycling Economy Nigeria

The main environmental and economic advantages of plastic waste recycling are;

- Reduction of municipal solid waste which helps save collection fees
- Improvement of municipal solid waste management services
- Increase in value-added refuse as plastics can be sold
- Reuse, therefore, less manufacturing pollution
- Reduction of environment and social complications at the disposal site
- Creation of employment opportunities throughout all recycling steps and
- Increased trained and skilled workforce.

Plastic Sustainable Recycling Economy Nigeria

The demand for recycled plastic materials is very high. The demand has been on the increase, and this is as a result of the cost of virgin resin materials.

Due to the high exchange rate (from N190/ $ to N350/$ between June 2015 to June 2016), the price of resins jumped up from between N9,000 and N9,500 per 25kg bag to between N19,000 and N19,500 per 25kg bag.

The demand for raw materials for the production of plastics correlates with the total demand for plastics. The higher the number of plastics demanded, the higher the number of raw materials (including recycled raw materials) required to sustain production.

Blue Box Program

Lagos State is starting to take notice of the environmental and economic benefits of recycling. In September 2019, the Lagos State Government launched the Blue Box Recycling Initiative. This initiative encourages the separation of recyclables at point of generation to ensure recyclables are uncontaminated, pass quality tests and as such as more valuable.

The goal of the initiative is to eliminate the role of scavengers (those who pick through waste in waste bins on streets) by 2021, ensure 50% of recyclables is collected by 2021, develop the green economy and reduce carbon footprint as well as encourage a clearer environment.

The Blue Box Recycling Initiative is being implemented with the help of Recycling Companies (such as Waste Point, Wecyclers, MEDIC and Green Hill) as well as Volunteers. Other Recycling Companies are welcome to assist in implementing this initiative but the Government requires a 5-10ton truck for collection, storing center minimum of 1,000 sq. km and capacity to collect waste in the Local Government Area/Community.

The Recycling Companies and Volunteers are in charge of dedicated Local Government Areas/Communities. They distribute colored bags to the households in their area, these households are encouraged to store their bottles, cans, plastics and paper waste in the bags. On Saturdays, the Recycling Companies and volunteers go to the households and collect this waste. The waste is then transported to the community recycling center in the Local Government Areas/Communities where it is sorted and sold to off-takers.

Final Thoughts

Plastic is an affordable, versatile and convenient product. Although Governments around the world are raising awareness, running campaigns, introducing levies and outright banning single-use plastic, its consumption is still high. Our only solution is to convert the used plastic material into new useful material in an environmentally friendly.

As the population grows, the middle class grows, and urbanization increases, so will plastic waste increase. As the population grows, the middle class grows, and urbanization increases, so will unemployment increase. With Plastic Recycling, the increased plastic waste will be turned into value and the increased number of unemployed can be hired in the Plastic Recycling Economy.

References

Geyer, R. Jambeck, J. J. and Law, K. L. (2017). Production, use, and fate of all plastics ever made. Sciences Advances.

Retrieved on August 14th, 2019 from https://advances.sciencemag.org/content/3/7/e1700782

Alem, 21facts about recycling plastics. Cut plastic sheeting. Retrieved on August 14th, 2019 From https://www.cutplasticsheeting.co.uk/blog/uncategorized/21-facts-about-recycling-plastics/

Le Guem, C. (2018). When the Mermaids Cry: The Great Plastic Tide. Coastal Care. Retrieved on July 30th, 2019 from http://plastic-pollution.org

Moore, C. (2019). Plastic Pollution. Encyclopedia Britannica. Retrieved on July 30th, 2019 from https://www.britannica.com/science/plastic-pollution

United Nations Environment. Beat Plastic Pollution. Our Planet is Drowning in Plastic Pollution. Retrieved on September 13th, 2019 from https://www.unenvironment.org/interactive/beat-plastic-pollution/

The World Bank. (2019) What a Waste 2.0: A Global Snapshot of Solid Waste Management 2050. Trends in Solid Waste Management. Retrieved on August 30th, 2019 from http://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html

The Thread Counts (2014). Paper Waste Facts: Paper comes from Trees…. Retrieved on August 31st, 2019 from https://www.theworldcounts.com/stories/Paper-Waste-Facts

NC State University (2019). Fume Safety. Retrieved on August 31st, 2019 from https://www.ise.ncsu.edu/processes/laboratory-equipment/welder-safety/welders-fume-safety/

Whirlston. (2019). Anaerobic Decomposition versus Aerobic Decomposition. Retrieved on August 31st, 2019 from https://www.fertilizer-machine.com/solution/Anaerobic-Decomposition-versus-Aerobic-D.html

Ugbodaga, K. (2018). Lagos Shuts Down Olusosun Dumpsite After Fire Outbreak. Sahara Reporters. Retrieved on August 31st, 2019 from http://saharareporters.com/2018/03/15/lagos-shuts-down-olusosun-dumpsite-after-fire-outbreak

Recycling Guide.org.uk (2019). How Glass is Recycled. Retrieved on August 31st, 2019 from http://www.recycling-guide.org.uk/science-glass.html

Felt, C. (2019). plastic waste: environmental effects of plastic pollution. Thrive Global. Retrieved on July 30th 2019 from https://thriveglobal.com/stories/plastic-waste-environmental-effects-of-plastic-pollution/

United Nations Environment (2018). Beat Plastic Pollution. Our Planet is Drowning in Plastic Pollution. Retrieved on September 13th, 2019 from https://www.unenvironment.org/interactive/beat-plastic-pollution/

Cohort hostel, (2018). Recycling Plastic. Cohort Hostel. Retrieved on August 31st, 2019 from https://www.stayatcohort.co.uk/2018/11/26/recycling-plastic/

FedCenter.gov (2017). Open Dumping. Retrieved on August 31st 2019 from https://www.fedcenter.gov/assistance/facilitytour/solid/dumping/

Blognus (2016). Methods of Plastic Waste Disposal (and possible complications). Plastic World, Plastic Nightmare. Retrieved on August 31st, 2019 from http://blog.nus.edu.sg/plasticworld/2016/09/06/x-methods-of-plastic-waste-disposal-and-possible-complications/

References

Blog.nus (2016). Plastic World, Plastic Nightmare. Methods of Plastic Waste Disposal (and possible complications). Retrieved on August 31st, 2019 from http://blog.nus.edu.sg/plasticworld/2016/09/06/x-methods-of-plastic-waste-disposal-and-possible-complications/

Royte, E. (2019). National Geographic. Is burning plastic waste a good idea? Retrieved on August 31st, 2019 from https://www.nationalgeographic.com/environment/2019/03/should-we-burn-plastic-waste/

Holger, R., Udo, J., Clint, F., Alexander, M.Z.F., Santosh, A. & Miriam, B.A. (2019). A Circular Solution to Plastic Waste. BCG. Retrieved on September 26th, 2019

Ritchie, H. and Roser, M. (2018). Our world in data. Plastic pollution. Retrieved on August 14th, 2019 from https://ourworldindata.org/plastic-pollution

Thisday, (2018). Huge Rewards from plastic recycling. Retrieved on July 29th, 2019, from https://www.thisdaylive.com/index.php/2018/06/12/huge-rewards-from-plastic-recycling-2/

Greentumble, (2018). How is plastic Recycled: Step by step Greentumble. Retrieved on July 31st, 2019 from https://greentumble.com/how-is-plastic-recycled-step-by-step/Emerson, C. (2019). All about recycling in Germany. How to Germany. Retrieved on September 9th, 2019 from https://www.howtogermany.com/pages/recycling.html

Dobush, G. (2019). The brutal reality of being the world's best recycler. Huffpost. Retrieved on September 9th, 2019 from https://www.huffpost.com/entry/germany-recycling-reality_n_5d30fccbe4b004b6adad52f8

Wecker, K. (2018). Plastic waste and the recycling myth. DW- Made for minds. Retrieved on September 19th, 2019 from https://www.dw.com/en/plastic-waste-and-the-recycling-myth/a-45746469

Nelles, M. (2016). Waste management in Germany – Development to a sustainable circular economy? ResearchGate. Retrieved on September 10th, 2019 from https://www.researchgate.net/publication/305892463_Waste_Management_in_Germany_-_Development_to_a_Sustainable_Circular_Economy

Emerson, C. (2019). All about recycling in Germany. How to Germany. Retrieved on September 9th, 2019 from https://www.howtogermany.com/pages/recycling.html

Umwelt Bundesamt (2019). Indicator: Greenhouse gas emissions. Retrieved on September 13th 2019 from https://www.umweltbundesamt.de/en/indicator-greenhouse-gas-emissions#textpart-1

Tradeshows. (2019). Mexico's plastics recycling industry. Tradeshows. Retrieved on September 19th, 2019 from https://mxmarketintelligence.wordpress.com/2019/02/12/mexicos-plastics-recycling-industry/

Nippon. (2019). Plastic love: japans prodigious usage and recycling of pet bottles. Nippon.com. Retrieved on September 10th, 2019 from https://www.nippon.com/en/japan-data/h00401/plastic-love-japan's-prodigious-usage-and-recycling-of-pet-bottles.html

Jtdadmin. Plastic recycling in south korea. Earthsquad. Retrieved on September 10th, 2019 from https://www.earthsquad.global/plastic-recycling-in-south-korea/

References

Global recycling. (2013). Japan: a mature waste market – with opportunities. Global recycling. Retrieved on September 24th, 2019 from https://global-recycling.info/archives/371

OECDiLibrary. (2017). Waste, materials management and circular economy. OECDiLibrary. Retrieved on September 24th, 2019 from https://www.oecd-ilibrary.org/sites/9789264268265-11-en/index.html?itemId=/content/component/9789264268265-11-en

Sapro, (2019). South African Plastics Recycling Organization. Sapro. Retrieved on August 1st, 2019. From https://www.plasticrecyclingsa.co.za/

Stats SA. (2018). Only 10% of Waste Recycled in South Africa. Retrieved on September 13th, 2019 from http://www.statssa.gov.za/?p=11527

United Nations Environment Program. (2019). Africa Waste Management Outlook: Summary for Decision-Makers. Retrieved on September 14, 2019

African Union. (2019). Key Transformational Outcomes of Agenda 2063. Retrieved on September 16th 2019 from https://au.int/en/agenda2063/outcomes

Babayemi, J.O. Ogundiran, M.B. Weber, R. and Osibanjo, O. (2018). Initial inventory of plastics imports in Nigeria as a basic for more sustainable management policies. PMC. Retrieved on September 10, 2019 from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6239059/

Fairtrade (2018), Nigeria plastprintpack. Fairtrade. Retrieved August 27TH, 2019 from https://www.ppp-nigeria.com/nigeria-plastic-print-packaging.html

BusinessDay. (2019). Plastic waste chokes lagos despite potential billion naira recycling industry. Business day. Retrieved on September 10th 2019 from https://businessday.ng/businessday-investigation/article/plastic-waste-chokes-lagos-despite-potential-billion-naira-recycling-industry/

Chanja Datti, (2019). transforming waste into value. Chanja Datti. Retrieved on August 27th, 2019 from http://www.chanjadatti.com/index.php/chanja-datti/about-us

Weconnect International, (2019). Chanja datti; a women-owned business changing the world. Retrieved on September 23rd, 2019 from https://weconnectinternational.org/en/network/africa/nigeria/news-and-events/chanja-datti

Greenhill Recycling. (2019). About us. Retrieved on September 27th 2019 from https://www.ghrng.com/about.php

Ubuntoo. (2019). Providing an opportunity for communities to capture value from their daily generated waste. Ubuntoo. Retrieved on September 23rd, 2019 from https://staging.ubuntoo.com/solutions/greenhill-recycling

Recycle Points. (2019). How it works. Retrieved on September 27th, 2019 from http://www.recyclepoints.com/how-it-works/

We-cyclers. We-cyclers; Home. Retrieved on 27th August, 2019. Retrieved from http://wecyclers.com

Adebiyi, B. The pride of Africa's women entrepreneurs. Lionesses of Africa. Retrieved on August 27th, 2019 from http://www.lionessesofafrica.com/lioness-bilikiss-adebiyi-abiola

Cathcart-Keays, A. (2015). Its money lying in the streets: meet the woman transforming recycling in Lagos. The Guardian. Retrieved on September 24th, 2019 from https://www.theguardian.com/cities/2015/oct/21/money-lying-streets-meet-woman-transforming-recycling-lagos-wecyclers

Deutschland. De. (2017). Vicfold recyclers, Nigeria. Deutschland.de. Retrieved on September 10, 2019from

https://www.deutschland.de/en/vicfold-recyclers-nigeria

References

Bellanaija. (2018). Waste remodeling champion olamide ayeni-babajide of pearl recycling is our bellanaija wcw this week. Bellanaija. Retrieved on September 10, 2019 from https://www.bellanaija.com/2018/11/waste-remodelling-champion-olamide-ayeni-babajide-of-pearl-recycling-is-our-bellanaijawcw-this-week/

Wastepoint. (2019). About waste point. Waste-point. Retrieved on September 10, 2019 from https://www.wastepoint.com.ng/about-us/

GIVO by Capture Solutions. (2019). About us. GIVO. Retrieved on September 10, 2019 from http://www.givosolutions.com/

Edom. S. (2018). How to start a lucrative plastic recycling company in Nigeria. StartupTipsDisplay. Retrieved on July 31st, 2019 from http://startuptipsdaily.com/how-to-start-plastic-recycling/

Uba, G. (2018). Huge rewards from plastic recycling. Pressreader. Retrieved on September 24th, 2019 from https://www.pressreader.com

LAWMA (2019). The Blue Box Program. Lagos State Waste Management Authority. Retrieved on January 3rd 2020 from https://lagosstate.gov.ng/blog/2019/10/09/still-on-the-lawma-blue-box-initiative/

Kadiri, F. (2019). Still On The Lawma Blue Box Initiative. Lagos State Government. Retrieved on January 3rd 2020 from https://lagosstate.gov.ng/blog/2019/10/09/still-on-the-lawma-blue-box-initiative/

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