

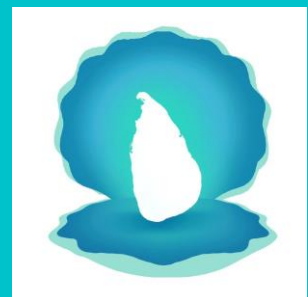
RESEARCH
CASE STUDY
ON PLASTIC
RECYCLERS IN
SRI LANKA



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The Pearl Protectors

September 2020



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An initiative of The Pearl Protectors

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THE PEARL PROTECTORS

The Pearl Protectors is a volunteer-based and non-profit marine conservation organisation in Sri Lanka. Established in 2018, The Pearl Protectors seek to mitigate the impacts of anthropogenic activities on the marine environment, reduce plastic pollution and promote sustainable practices through youth-engagement, volunteerism, awareness and advocacy.

Projects undertaken by The Pearl Protectors over the years entail the launching of the 'Pearl Protector Approved' Accredited Standardisation Certificate to promote a plastic-free dining culture; the annual construction of a Christmas tree out of discarded plastic bottles to highlight single-use plastic pollution; school education programmes; ecobrick workshops; coastal cleanups; and social media campaigns to inspire action towards protecting the marine environment.

The purpose of this advocacy initiative in preparing case studies is to identify the existing plastic waste recycling companies while emphasizing the need to increase plastic waste recycling in Sri Lanka.

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ABBREVIATIONS

ABS- Acrylonitrile butadiene styrene

CEA - Central Environmental Authority

CEIF - Community Environmental Initiative Facility

CEB - Ceylon Electricity Board

HIPS - High Impact Polystyrene

PC - Polycarbonate

PET - Polyethylene terephthalate

PVC - Polyvinyl chloride

PP - Polypropylene

PS - Polystyrene

HDPE - High Density Polyethylene

LDPE - Low Density Polyethylene

INTRODUCTION

The word “plastic” is a derivation from the Greek term *plastikos*, which means fit for molding (PlasticsEurope, 2020). The term plastic is commonly used to describe synthetic materials that are made up of long chains of polymers. Even though these polymers differ from type to type, plastics are usually lightweight and can be moulded to make objects of different shapes and sizes. Plastics are one of the most widely used synthetic materials around the world due to its properties like durability, flexibility, and being waterproof, making plastic valuable for several different applications from food packaging to prosthetic body parts. Plastic production increased exponentially after World War II due to its convenient and cheap nature. It was estimated that the production of plastics increased from 2.3 million tons in 1950 to nearly 448 million tons by 2015 globally and that nearly 8.3 billion metric tons have been produced cumulatively by the year 2018 and out of that nearly 6.3 billion has become waste and only 9 percent of that has been recycled worldwide (Parker, 2018). It is estimated that over 150 million tons of plastic waste are currently floating in the ocean (World Economic Forum, Ellen MacArthur Foundation and McKinsey & Company, 2016).

Accordingly, the disposal of plastic waste has posed a massive crisis due to the length of time it takes to photodegrade. On average it takes about 10 to 1000 years for plastic to degrade and this time varies according to type. For instance, PET bottles nearly take up to 450 years to decompose (ThoughtCo, n.d.). Once exposed to the sun, PET bottles photodegrade into small particles which in turn pose another threat as these microplastics can get into the food cycles of lifeforms. Microplastics produced by the breakdown of plastics are later ingested by marine life which ends up in human food. In addition to this, plastic is consumed by sea animals including sea turtles and birds who mistake them for edible food.

Plastic waste is a huge dilemma faced by the world with no successful solution and has resulted in unprecedented marine pollution and environmental degradation. Recycling of plastic is one viable solution to this crisis. Recycling is a process in which waste plastic is processed and converted into products that can be reused again. These recycled materials might be completely different from their original state. With the modern

breakthroughs in science and technology recycling has become more and more efficient, however, the amount of plastic that is being recycled is low in comparison to the amount of virgin plastic manufactured (Kutz, 2017).

It is estimated that Sri Lanka imports nearly 260,000 MT of plastics per year which includes both finished and processed plastics and plastic raw materials as no virgin plastic is produced within the country (Gunaratna, 2012). Many private companies are engaged in the recycling industry; however, the system is not sufficient to address the increasing amounts of plastic waste. The need for an effective plastic recycling mechanism exists as this process can aid in reducing the amount of plastic waste that would otherwise end up in the environment. Another issue that exists is the lack of data availability and information regarding the plastic recycling industry and this study is a step forward to address this issue.

Approximately, 30 types of plastics are used and the majority of these types are recycled within the country. The Western Province was targeted as the main location of the study as the province houses the greatest number of plastic waste recyclers in the country. Nearly 7000MT of solid waste is generated in Sri Lanka daily and the Western Province contributes to nearly 60 percent of this value (Hettige et al., 2014). A total of 15 plastic recycling industries that were registered with the Central Environment Authority were selected at random for the study.

In this analysis, the scope of engagement in the recycling of plastic by private recycling companies will be analyzed to deliver an overview of the plastic recycling industry within the Western Province in Sri Lanka. Challenges faced by these companies will also be looked into, to better understand steps that could be taken to improve the recycling industry and to formulate a sustainable solution to plastic waste management within the country.

PLASTIC RESIN IDENTIFICATION CODE

The ASTM International Resin Identification Coding System was developed to identify the plastic resin material out of which a product is made. The code can assist in the identification and separation of plastics so that they can be reprocessed and recycled efficiently. The resin code provides a code number for each of the six most commonly obtained resin varieties and a seventh category has been created for all the other types.















Resin	Resin Identification Code-Option A	Resin Identification Code-Option B
Poly(ethylene terephthalate)	 1 PETE	 01 PET
High density polyethylene	 2 HDPE	 02 PE-HE
Poly(vinyl chloride)	 3 V	 03 PVC
Low density polyethylene	 4 LDPE	 04 PE-LD
Polypropylene	 5 PP	 05 PP
Polystyrene	 6 PS	 06 PS
Other resins	 7 OTHER	 07 0

Image 1: ASTM Plastic Resin Code
(ASTM, 2020)

Taking a look at the types of plastics described in the plastic resin code,

1. Polyethylene terephthalate or PET is represented by recycling number 1 and it is a clear, tough material that has moderately good gas barrier property. It is also a lightweight plastic that is made to be semi-rigid or rigid and is commonly used in food packaging for soft drinks, single-serve water etcetera.
2. High-Density polyethylene also referred to as HDPE is represented by recycling number 2 and is an opaque semi-flexible plastic with a waxy feel. It is resistant to moisture and is gas permeable. It is mostly found in shopping bags and is also used in crates and bottles etc.
3. Resin code number 3 identifies Polyvinyl chloride or PVC which is usually clear. It is an extremely versatile material that can be used from pipes and tubing to bottles etc.
4. LDPE or Low-Density Polyethylene is a cheap polymer with very little water absorption and is easy to mould and process. It is identified by resin code number 4 and is translucent and has a waxy surface. It is usually found in household items like plastic wrap, squeeze bottles, and garbage bags, etc.
5. Polypropylene or PP is represented by the Resin code number 5 and is a hard and tough material. It can be translucent or transparent depending on the conditions. It is resistant to heat and chemicals and acts as a barrier to moisture. It is an extremely versatile material that can be found in toys, furniture, crates, packaging, etc.
6. Polystyrene is a clear and rigid plastic that is represented by the resin code number 6 and one of its most famous applications is 'Styrofoam' also known as packing peanuts. It is also found in disposable cups and cutlery and takeaway containers etc.
7. Resin code number 7 represents all other resins and includes multi-materials such as nylon, polycarbonates (PC) and Acrylonitrile Butadiene Styrene (ABS), etc.

PURPOSE OF RECYCLING PLASTIC

Plastic recycling provides several advantages from both a financial and environmental standpoint. One of the major advantages of recycling is providing an efficient pathway to solid waste management. Recycling more plastic means less plastic getting dumped in landfills. Landfills and open dumps have a large negative impact on both human life and the environment. Landfills can take up a large amount of space. It is estimated that recycling one ton of plastic can save up to 7.4 cubic yards of landfill space (West, 2019). Plastics accumulated in landfills also break down to smaller microplastics which can leak into groundwater and to the ocean. This can be extremely harmful to terrestrial ecosystems, marine and human life as these microplastics can accumulate in food webs. Metals and other harmful chemicals can attach to these small microplastics causing various diseases inside the human body.

Plastic recycling can further provide a high economic impact and support the communities. Recycling creates new employment opportunities and provides livelihoods. It can also help in conserving both energy and natural resources such as petroleum, water, natural gas, etc. It is estimated that recycling a ton of plastic saves an amount of energy equal to 5,774 kWh (Stanford, 2020). The reduction of crude oils also has a direct impact on the reduction of carbon dioxide emitted into the atmosphere.

Plastic Recycling Process

The main form of recycling taking place in Sri Lanka is mechanical recycling. This plastic recycling process usually takes place in four main steps.

Collection and Sorting

- The discarded plastic is collected and sorted according to the type of polymer and sometimes by colour as well.
- Next the sorted plastic is baled.

STEP
01



Baled PET bottles
(Eco Spindles (PVT) Ltd., 2020)



Washing

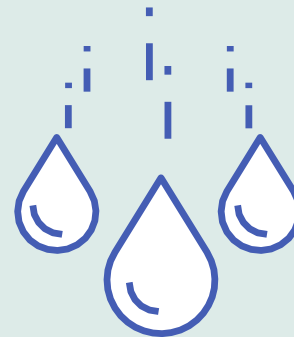
- These small flakes are washed to remove any contaminants present.
- The presence of any contaminants will have a considerable effect on the quality of the plastic.
- Could be considered the most important step in the process.

STEP
02

Size Reduction

- The separated plastic waste is broken down into smaller flakes to reduce the size.

STEP
03



Extrusion and Pelletizing.

- The recycled flakes are dried and are extruded to form long strings of plastics.
- Pellets are formed by cutting these strings of plastics.

STEP
04



Recycled plastic flakes
(Eco Spindles (PVT) Ltd., 2020)

LEGAL DEVELOPMENTS ON PLASTIC RECYCLING IN SRI LANKA

Considering the steps put forward by the country, in 2007, an attempt was brought to prohibit the manufacture, sale, and use of polythene of twenty microns or below in thickness under the Gazette No. 1466/5 which later turned out to be abortive. Gazette No. 1627/19 of 2009 prohibited the dumping of solid waste at any place other than the places designated for such purposes.

Regulations were brought in 2017 under Gazette No. 2034 to prohibit the manufacture and use of polythene products of 20 microns or below in thickness (No.2034/33). It further prohibited manufacturing food wrappers such as lunch sheets from polythene which included high-density polyethylene, low-density polyethylene, and polypropylene (No.2034/34), and food containers referring to lunch boxes, plates, cups, and spoons from expanded polystyrene (No.2034/38). It further prevented the use of bags manufactured from high-density polyethylene used for carrying goods or products including grocery bags which are generally referred to as “sili-sili bags” (No.2034/35). The same gazette prevented the above from being used for sale, offer for sale, offer free of charge, exhibited, or usage within the country. It also prohibited the use of polyethylene, polypropylene products as decorations in any event or occasion (No.2034/37), and incinerating plastic, that no one shall burn openly or cause to, allow or permit the open burning of refuse or other combustible matters including plastic (No.2034/36). In addition to these, recently the cabinet approved the proposal to ban a range of plastic products from the markets which will be effective from 1st January 2021. This ban includes chemicals or pesticides packaged in Poly Ethylene Terephthalate (PET) and Vinyl Chloride (PVC) containers, sachets made of polythene and plastic less than 20 ml / 20 g (excluding food and medicine), various inflatable toys made of plastic (excluding balloons, balls and floating toys), plastic cotton buds (excluding hygiene products). The main purpose of this is to protect the wildlife which has been affected by the plastic waste crisis.

OBSERVATIONS REGARDING SELECTED PLASTIC RECYCLING COMPANIES

EMP PVC Technology (Pvt) Ltd



Address: No.16, Templeburg Industrial Estate, Panagoda, Homagama, Sri Lanka

Telephone: +94 11 2742777

E-mail: info@pvc.emp.lk

EMP PVC Technology (Pvt) Ltd was founded nearly fifteen years ago and currently is one of the largest national-level recyclers in Sri Lanka. Their main focus is recycling PVC or Polyvinyl chloride represented by the resin code number 3. The final product after recycling is PVC Agri Pipes. However, due to unfortunate conditions, they have to take a hiatus for nearly two years and downscale their employee base from nearly 150 workers to 30 workers. Fortunately, the conditions have improved and they have again started to gain ground in the plastic recycling industry. Currently, they collect nearly 100 to 150 tons of plastic waste monthly which is supplied to them by their collection service and from a recognized supplier base. They have an average monthly output of nearly 80 tons and according to their statistics, they have wastage of only about 4 percent. They also started a special project which focuses on eco-friendly detergents to support their recycling line.

Eco Spindles (Pvt) Ltd.



Address: No.278/4, Level 17, Access Towers, Union Place, Colombo 2, Sri Lanka (Head Office)

Telephone: +94 11 2307168, +94 11 2307170

E-mail: info@ecospindles.com

Website: <https://www.ecospindles.com/>

Eco Spindles can be identified as the leading company regarding PET bottle recycling and they operate as a manufacturer of value-added products from recycled plastic. While they recycle PET, HDPE, LDPE, and PP, 80% of the recycling undertaken by them is PET. BPPL Holdings is the parent company of Beira Group and Eco Spindles Private limited is one of the subsidiaries of BPPL. Their network expands with 5 factories island wide including 400 direct collectors and around 1500 indirect collectors of waste island wide. Eco Spindles is equipped with 20 PET baling centers around the country. Direct waste collection is done through 7 collection trucks that collect around 7 tons of plastic waste per day. They are the only hot washed PET flakes manufacturer in Sri Lanka and the only polyester yarn manufacturing plant in the country.

They are also one of the two plants equipped with the capability to create yarn directly from flakes.

At Eco Spindles, yarn is produced from recycled PET flakes. Regarding the recycling capacity, they currently possess the ability to recycle 350 tons which is 12 million PET bottles. At present, they recycle around 250 tons of plastic per month. As the end products they create, polyester yarn fabrics, cleaning brush filaments, and paint brush filaments. PET filaments contain versatile nature and are eco-friendly and have excellent elastic memory which is highly beneficial. Produced monofilaments are sold to the sister

company Beira Brush (Pvt) Ltd. while other brush manufacturers are exported directly to customers worldwide.

They have provided yarn for national projects as well as to the world's leading brands such as Nike and Adidas. Recently they provided yarn for creating the official jerseys to be worn by the Sri Lankan National Cricket team during the ICC Cricket World Cup 2019. Eco Spindles's distribution network expands for around 18 countries worldwide including Sri Lanka, Canada, USA, Mexico, Jamaica, Panama, Ireland, England, Netherlands, Denmark, France, Turkey, Dubai, India, Bangladesh, Indonesia, and New Zealand.

Apart from their recycling mechanism, they engage in community projects working with the Sri Lankan Navy and other community organizations for the reduction of plastic waste in the environment. Some of their launched projects are;

- Southern Expressway waste management programme that was initiated in March 2018 in collaboration with the Road Development Authority and John Keells Holdings. Together they have collected 3015 Kg of PET bottles up to October 2019 under this project.
- Katunayake Expressway waste management programme was initiated in October 2018 with the collaboration of Road Development Authority and Coca Cola Beverages (Pvt) Ltd.
- Kataragama waste management programme in collaboration with Coca Cola and Soba Mithuru Youth Club (5760 Kg PET bottles collected in 2017, 5725 Kg PET bottles collected in 2018, and 4275 Kg PET bottles collected in 2019)
- Thalawila Church waste management programme in partnership with Coca Cola. (470 Kg PET collected in the season of 2018 and 3702 Kg of PET collected in the season of 2019)
- Crow Island beach cleaning programme together with Parley for Oceans and Caritas Sri Lanka. (637 Kg PET bottles collected on 5/11/2018)
- Sri Pada plastic waste management programme with Link Natural products, Maskeliya DC and Wildlife Department, Nallathanniya. (5000 Kg PET collected in 2018-2019)
- Coastal area cleanups where Sri Lankan Navy and Coast Guard collect and deliver waste PET bottles to Eco Spindles

- Eastern province waste management project with Sri Lankan Navy and MAS Holdings
- Trincomalee waste management project with Sri Lankan Navy and MAS Holdings
- Projects are done in different schools around the country
- Fisheries Harbour project
- Sri Lanka Army Wannu Headquarters with Sri Lankan Navy and MAS Holdings



Image 2: End products produced from the recycled plastics by Eco spindles. (Eco Spindles (PVT) Ltd., 2020)



Image 3 : Scrap materials to be recycled. (Eco Spindles (PVT) Ltd., 2020)



Image 4: Baled PET bottles (Eco Spindles (PVT) Ltd., 2020)

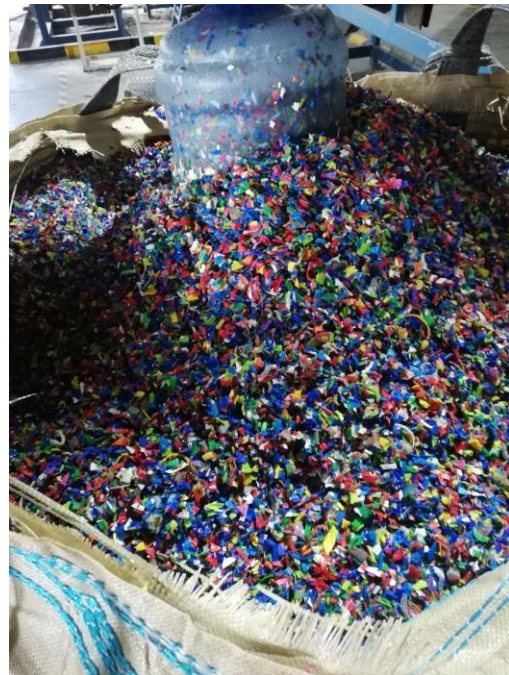


Image 5: Recycled plastic flakes (Eco Spindles (PVT) Ltd., 2020)

VIRIDIS (Pvt) Ltd.



Address: Viridis (Pvt) Ltd, Block no. 'B', Templeburg Industrial Zone, Panagoda, Sri Lanka

Telephone: +94 11 4852708 / +94 777 260747

E-mail: info@viridisrecycle.lk

Website: www.viridisrecycle.lk

VIRIDIS is one of the few recyclers in the country that focus mainly on PET recycling. It started in 2005 as the first recycler of PET, incorporated under the Companies Act 2002, registered with the Board of Investment, Ministry of Industrial Development, Export Development Board, and Waste Management Authority. Mr. Stewart, a UK citizen is the founder of the business who has identified the dire need for recycling PET bottles in Sri Lanka to minimize the amounts of plastic waste that results in environmental pollution. Apart from PET, they also recycle electronic waste, PP, HDPE, and LDPE. According to the data gathered, 80% of the recycled plastic waste is PET bottles, and they recycle an approximate amount of 60 tons of plastic per month whereas having recycled over 10,000 metric tons of plastic up to date. VIRIDIS also works as a subcontracting party with Eco Spindles. VIRIDIS receives plastic waste from around 150 plastic waste suppliers island wide including municipal councils, hotels, and private companies whereas around 12 Municipal Councils in the country provide plastic waste for them. Their service extends to more than 400 corporate bodies and large, medium and small-scale business organizations. Informal waste collectors also play a role who collect plastic waste from dumping grounds and then hand them over to VIRIDIS for money. VIRIDIS manufactures PET flakes and PET pallets as their end product from the recycling process and these products are mainly exported while a small percentage ends up in the local market. Their partnership with Eco Spindles and companies like Coca Cola has led to a series of projects to collect plastic waste from public places. One such is where Coca Cola has

placed waste bins at a few public places and provided the waste collected from those places to VIRIDIS. Plastic waste from highways is also provided to VIRIDIS and Eco Spindles. They have recently partnered with the Keells PET collection project.



Image 6: Collected plastic for Recycling
(Viridis Plastic Recycling, 2020)



Image 7: recycled PET bottle flakes
(Viridis Plastic Recycling, 2020)

Whiteline Industries Colombo (Pvt) LTD



Office Address: No.169, New Moor Street, Colombo 12, Sri Lanka

Factory Address: No.86, Magurawila Road, Gonawala, Sri Lanka

Telephone: +94 11 2344821

Website: www.feather.com.lk

Registration ID: PV-2124

Whiteline Industries Colombo (PVT) LTD was established in 1995 as a trading company by Mr. Rishad Ismal, who instigated the manufacturing of cleaning tools in 2007 using both recycled and virgin plastics. In 2019, they set up the production line for PET monofilament using 100% recycled PET waste collected within Sri Lanka. Whiteline purchases washed PET from Viridis (PVT)LTD and recycles an approximate amount of 30 tons monthly to produce brooms and brushes. Whiteline Industries is well-known for their brooms created from recycled plastic. As the demand for brooms grew rapidly, they have acquired machinery and molds to extend the product range from brooms to scrub brushes, deck brushes, floor mops, wipers, toilet brushes, insulated thermoware, etc.



Image 8: Brooms made from recycled PET
(Feather, 2020)

Plas Techs (Pvt)Ltd



Factory Address: No.706/B, Negombo Road, Mabola Wattala, Sri Lanka

Office Address: No.98/7, Hospital Road, Kalubowila, Dehiwala, Sri Lanka

Telephone: +94 777 325697

E-mail: cmbplast@gmail.com

Plas Techs (PVT) Ltd recycles PET, PVC, and other types of plastic including ABS and PC. They obtain more than 30 tons of plastic per month from direct contact collectors and produce up to nearly 30 tons of recycled plastics pellets per month. Plas Techs have contributed to community projects with different partners and one such is the Dell Technologies Ocean Cleanup Campaign that aimed to battle the plastic waste issue prevailing in Sri Lanka.

Polo Plastics



Address: No.370, Negombo Road, Wattala, Sri Lanka

Telephone: +94 78 5691609

The founder of Polo Plastics is Mr. Bashiyar and he started Polo Plastics around the 1980s. Polo Plastics has a factory operating for more than 30 years now. They recycle all types of recyclable plastic (PP, PET, HDPE, LDPE) they receive. Polo Plastics does not manufacture any end products from recycled plastic but they clean the waste plastic and then recycle and resell for manufacturing irrigation pipes. They receive an approximate amount of 15-20 tons of plastic per month. Apart from the local market, they export to a few Chinese and Indian companies.

The factory was initially situated in Hendala town but has now been relocated to Ragama after purchasing new land. Unfortunately, due to the lack of funds as a result of the Coronavirus pandemic factory building operations had been postponed.

Mr. Bashiyar has requested to provide a percentage of the income generated from the tax on imported plastic to Sri Lankan recyclers as an aid in continuing their operations but yet to receive any positive feedback.

Kalahari Enterprises



Address: No.398A, Gunasekara Mawatha, Heiyanthuduwa, Sri Lanka

Telephone: +94 11 2401167

Kalahari Enterprises was founded in 2005 and focuses mainly on the exporting of PET aka Polyethylene terephthalate and rubber. They rely on their collection service and collect nearly 50 tons of scrap per month. They mainly segregate their waste according to colour which is then cleaned and later exported. They export nearly 8 tons per month and have an established customer base.

M.M.J. Services



Address: No.4/12, Alwis Mawatha, Batewela, Ranala, Sri Lanka

Telephone: +94 71 6076794

M.M.J Services was founded nearly 15 years ago and recycles High-Density polyethylene (HDPE), Low-Density Polyethylene (LDPE), and Polypropylene (PP). They collect more than 12 tons of scrap material which are segregated according to type and colour. Their output is nearly 10 tons per month and is sold in the form of pellets.

S.K.K. Recycling



Address: No.210, Batakeththara, Madapatha, Piliyandala, Sri Lanka

Telephone: +94 77 6316013

S.K.K. Recycling has been operating in the plastic recycling industry for nearly thirteen years. They recycle both Polypropylene (PP) and High-Density Polyethylene (HDPE). The scrap material for recycling is provided to them by their established supplier base and amounts up to nearly 60 tons per month. These waste materials are then segregated and then processed to produce pellets. According to the data obtained, nearly 45 tons of recycled plastic is produced monthly.

J.S Recycle Polythene



Address: No.262/24, Kosgama Village, Kosgama, Sri Lanka

Telephone: +94 777 899361

J. S. Recycle Polythene was started in 2000 and it mainly focuses on recycling polythene. They collect more than 3.5 tons of waste materials daily from government factories and other factory outlets. According to the data provided, they recycle nearly 60 tons of polythene monthly and more than 600 tons annually. Their final recycled product is polythene that is used in concrete laying processes.

Modern Pack Lanka (Pvt) Ltd.



Address: No.418, Gonapala, Thalagala Road, Thalagala, Sri Lanka

Telephone: +94 77 3434838

Modern Pack Lanka is relatively new to the plastics recycling industry in Sri Lanka and focuses mainly on recycling HIPS or High Impact Polystyrene and Polypropylene or PP. The main source of HIPS and PP comes from yoghurt cups. They obtain nearly 4 tons of waste material per month from an established supplier base. The foils of the yogurt cups are then manually removed and the cups are then processed. They produce nearly 2.6 tons of pellets per month. Modern Pack Lanka launched a recycling project in 2019 for the collection of discarded yoghurt cups which are processed to be turned into seed farming trays.

Dot Line Packaging



Address: No.6/1 A, Magadeniya Road, Oruwala, Athurugiriya, Sri Lanka

Telephone: +94 777 259835

Dot Line Packaging was founded by Mr. Palitha Jayawardena and they engage in recycling LDPE and HDPE. They recycle an approximate amount of 20-25 tons of plastic per month. They have a network of factories and companies from where plastic waste is collected and does not collect from the outside as waste plastic tends to be uncleaned most of the time. Plastic waste is collected from such factories through their lorries.

Seth Sevana Foundation



Address: No.654/4, Industrial Estate, Galle Road, Ratmalana, Sri Lanka

Telephone: +94 78 5802187

Seth Sevana was established back in 1998 as a foundation for advocating plastic waste management and is now engaged in recycling as well. The Community Environmental Initiative Facility (CEIF) has helped to set up the waste management project of the Seth Sevana Foundation. Mr. D.S. Ferdinando is the proprietor of the foundation. Their factory is situated on 40 perches of land. They recycle HDPE, LDPE, and PP and recycle an approximate amount of 30 tons of plastic per month. Seth Sevana mainly takes industrial waste polythene and plastic for recycling. They clean the waste, segregate, and recycle plastic waste to create shopping bags as the end products from recycling.

Mr. Lloyd Fernando who is the project manager of Seth Sevana has also been engaged in many projects launched from CEA back in the 1990s and has submitted a project proposal in 2000 on waste segregation and recycling for the first time in Sri Lanka.

Parama Plastic Recycling Center



Address: Manana Road, Koshena, Galpatha, Sri Lanka

Telephone: +94 777 392975

Facebook: <https://www.facebook.com/ParamaPlasticRecycleCenter/>

Parama Plastic was started in 2016 by Mr. K.D.P.M. Gunawardena. Parama Plastic employs 15 workers as of now and they recycle PP and HDPE mainly. They engage in manufacturing irrigation pipes as the end product from recycling. Parama Plastic collects waste directly from the community by their lorries. Their factory is situated in Bandaragama and recycles about 75-80 tons of plastic waste per month.

Tannoi Electric Industries



Address: No.266/2A, Mabima, Heyiyanthuduwa, Sri Lanka

Telephone: +94 777 307206

Tannoi Electric industries were established nearly 15 years ago and specialises mainly in recycling plastics found in electric appliances like PP and HIPS. They obtain up to 30 to 40 tons per month from an established supplier base. These materials are then segregated according to type and then processed to produce pellets. They produce more than 30 tons monthly and according to the data provided, have wastage of about 5 percent.

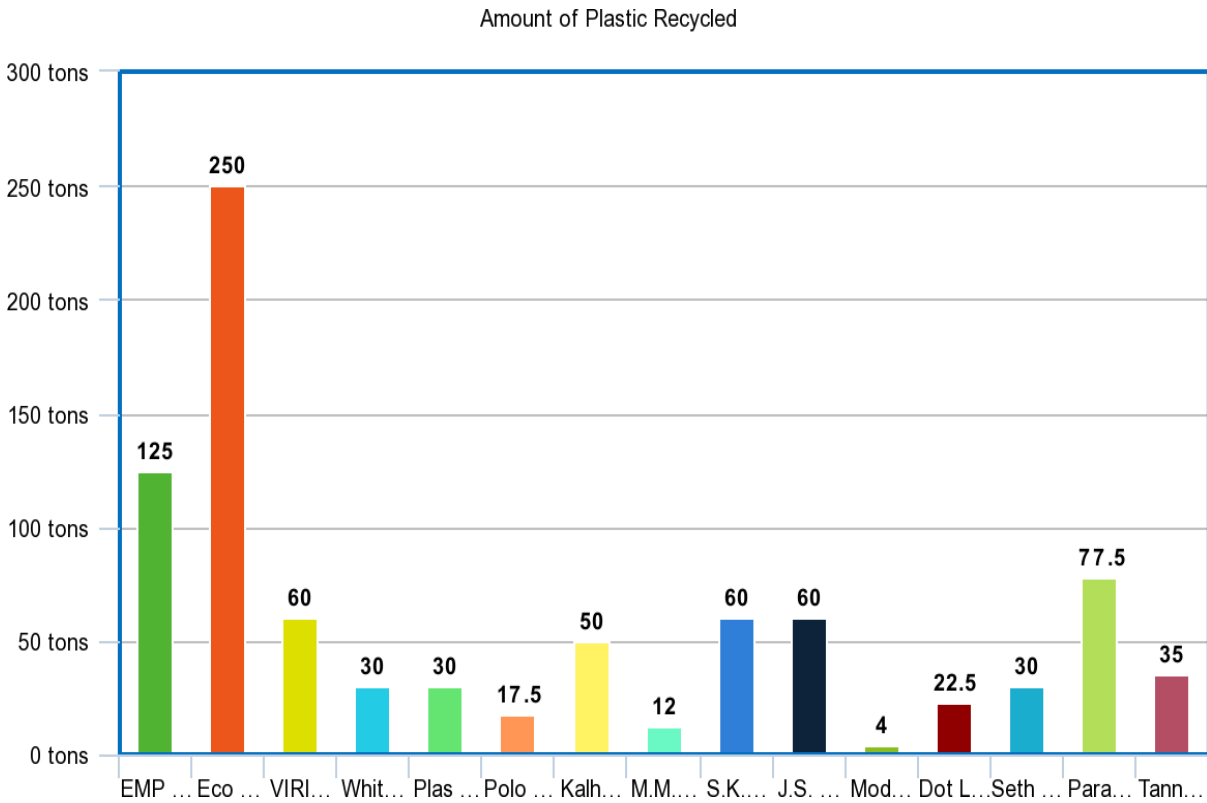


Chart 1: Graph depicting the amount of plastic recycled by individual recycling companies

DISCUSSION

The particular research carried out on the sample of randomly selected plastic recyclers has given insight into the level of recycling taking place within the Western province in Sri Lanka and also a layout of the challenges endured by such recyclers and possible steps which can be taken as a country to uplift their capacity and thereby to minimize the increasing amounts of plastic dumps that are being created. The data from the study suggests that there is potential for the current recycling capacity to increase. However, in order to do so, attention must be directed towards the challenges the recyclers are facing right now.

The observations from the study were summed up through the use of a bar graph shown above. Using the above pictorial representation, we can observe that right now individual recycling levels remain below 300 tons for each of these recyclers.

Development of a better relationship with public authorities

Even though almost all of the recycling companies have been operating with the main purpose of uplifting the environmental sustainability of the country, there exists a lack of necessary support for the recyclers from the public authorities. Financially these companies have been operating through obtaining loans upon their capacity and operating solely based on their capability in continuing the business. Most of these loans were also obtained from private banks as some recyclers highlighted the fact that state banks take plenty of time for the loan approval process.

The recyclers also highlighted the need for the CEA to play a better leading role in tackling the waste crisis. As per their experiences so far with engaging in recycling, the support provided by the CEA is not sufficient. Most recyclers bear the opinion that a healthy relationship should exist between the CEA and the recyclers as they provide a service to the community which is extremely useful and that the CEA should act as the moderator between the recyclers and the government.

Some of the interviewees from different companies emphasized the need for a special loan facility exclusively for recyclers to help them with their operations and they admitted that the CEB should provide more lenient payment options and dates for the payments for electricity. The main reason for this, according to their argument, is that the timeline between payments and receipts do not overlap. For example, customers take nearly 60 days to pay them but they have to pay the CEB monthly for electricity.

Recycling different types of plastic, specifically recycling PET with other types of plastic is problematic therefore these companies also emphasized the need to have sufficient land to continue their operations. Another hindrance is the lack of maintenance facilities. If a machine requires undergoing repairs the required equipment needs to be imported which is expensive. Action needs to be taken to build maintenance facilities in Sri Lanka. Exporters hope that a reduction in taxes and tariffs would be applied for their products as of right now the percentage taken up by taxes is too high.

Small scale recyclers like Seth Sevana Foundation face the challenge of not having sufficient machinery and funds to carry out their operations. If there is a special loan system as suggested above, such situations can be fairly settled. To aid them in situations such as these and also in general, the government has the responsibility to implement special schemes and concessions. A special loan facility or a special scheme can help them with such issues, resulting in the appearance of more recyclers and also the existing recyclers could extend their operations.

Introducing proper waste disposal procedures:

In most public places, waste collection bins can be observed, separated according to the nature of the waste usually as polythene/plastic, paper, food waste, and glass. Most of the plastic/polythene waste that is being dumped into such bins are usually food wrappings, PET bottles for soft drinks or water. Even though the waste bins exist there is no rule in place to clean the waste before discarding into the bins. This has affected the recycling companies as it is difficult and time-consuming to clean the waste and recycle. Eco Spindles have separate machines especially with the ability to clean waste PET bottles with hot water but this is only limited to them and medium-scale and small-scale recycling companies do not have such facilities thereby limiting the amount of waste that can be recycled by them. Dot Line Packaging is one such company that has limited its plastic waste collection to a specified list of sources and not recycling the domestic waste collected from the community. For instance, Modern Pack Sri Lanka has faced a major challenge with regards to improper disposal of the yogurt cups that are recycled. They believe if the consumers removed the foil before disposal it would save a lot of extensive labour hours thus reducing expenses and making the process more efficient. Emphasis should be paid to implement a proper segregation and cleaning process for plastic waste other than dumping the waste together. This would assist in solving this issue and increase the amount of plastic being recycled.

Implementing mechanisms to increase the amount of waste collected:

Companies like Eco Spindles can increase the amount of recycling but their issue is not receiving sufficient amounts of plastic for the cause. Seth Sevana Foundation and Plas Techs also emphasized the problem of not receiving sufficient waste to recycle which is caused by a lack of having proper collection procedures. Most recyclers also pointed out that a constant equilibrium of both customers and suppliers should exist for a successful flow of recycled products. Primarily there should be proper collecting procedures and storage for the collected waste before it reaches the recycling centers. To successfully implement this, the number of grassroots collectors in communities should increase. This could be done by providing incentives to collectors. Next, an effective and efficient transportation mechanism should exist as most recyclers revealed that transporting waste materials to the plants is not efficient. They believe hubs must exist especially in municipal councils which could act as the final collecting point from all the grassroots recyclers. These hubs should segregate the plastics and prepare it for transport, enabling the recyclers to select the type of plastic they require and transport it from the hub straight away.

Regarding the waste collected through drains, floating trash traps that were recently implemented could be launched island wide creating a special mechanism in collecting the waste which would otherwise end up in water bodies around the island.

Furthermore, equipping regional collection centers with compressing(baling) machines can aid in minimizing storage space and reduce transport costs. This research also made it evident that there are already existing baling machines for some municipal councils but there is a lack of technical knowledge in operating them which in turn has made such bailing machines ineffective. While it is necessary to equip the collection centers with the necessary machinery, technical knowledge should also be provided to enhance the operations.

Impact in unforeseen circumstances:

Apart from the minority of the large-scale recycling companies, the majority of the recyclers have experienced grave consequences due to the recent pandemic. Several businesses were pushed to the brink while some had even gone to the extent of closing down the businesses due to a lack of funds in continuing operations. Eco Sans Plastic (Pvt) Ltd. is one such company that has been engaging in plastic recycling starting from the year 2000 but had to shut down in the early months of 2020 due to the impact of the pandemic. Additionally, companies like Parama Plastic Recycling Center faced grave consequences during the pandemic period.

Sudden power cuts can be identified as another hindrance to recyclers. For example, the recent series of blackouts implied that the recyclers had to either cease operations for the day or use diesel-powered generators which are comparatively more expensive. These unplanned circumstances have driven the plastic recycling industry to experience tough times and highlighted the importance of the involvement of the governing body of the country. Special attention should be paid to their impact and there should be an exclusive mechanism for recyclers to function and to aid them in case of another unplanned catastrophe.

Increasing the Customer Base:

As highlighted earlier an equilibrium must exist between the supplier base and a customer base to match both demand and supply. To increase the number of suppliers, the government could provide attractive incentives to manufacturers. For example, special subsidies could be given to manufacturers who use recycled plastics which are up to the manufacturing standard instead of using imported virgin plastics. Taxes and tariffs on exported recycled plastics should also decrease to provide exporters a better rapport in international markets.

Sri Lanka and the concept of Extended Producer Responsibility:

Most recyclers hold the idea that the government should implement the Extended Producer Responsibility to tackle the issue of not having sufficient funds allocated to manage waste within the country. This mechanism can in turn make producers responsible for the environmental impacts of their products.

Lack of skilled labour:

When it comes to plastic recycling the lack of a sufficient skilled workforce is a major deterrent. This is essential for operations and maintenance requirements. Recyclers highlighted that if the required rapport was given to this field a thriving workforce would be established especially if there were growing career paths for professionals looking to approach the recycling field. Some recyclers pointed out that even though some individuals are interested in recycling the lack of knowledge providing options acts as a barrier to such people.

Negative aspects of recycling

Even though recycling does have its benefits, it does not provide a complete solution to the plastic waste crisis. It is the last “R” of The Three R's of waste management which stands for Reduce, Reuse, and Recycle. Furthermore, recycling plastics is still energy-intensive which means right now precious renewable resources are consumed especially in Sri Lanka where the majority of power comes from coal power stations.

Another factor is that depending on how the materials are re-processed during recycling, recycled materials could theoretically never achieve 100% of the mechanical properties of virgin plastics. The degradation of these properties has a direct effect on safety factors and long-term performance measures such as fatigue which often means they come with lower safety ratings.

It should also be noted that products manufactured through the use of recycled plastics cannot be recycled again therefore it is not circular. Moreover, recycled plastic might be used for any product other than that of the packaging of foods or drugs even though new forms of recycling are providing alternatives to this. For example, in Sri Lanka, the ability to make a brand-new bottle from a recycled PET bottle does not exist and instead, it is recycled to produce a new value-added product. This mechanism is available in some countries where bottles are made from recycled PET and are known as RPET bottles (Recycled PET). However, recycling plastic is identified as a credible solution to manage the growing amounts of plastic waste and it is important to make sure that a separate body exists to determine the efficiency of the recycling process.

Practical challenges of the Case Study Research

Throughout the course of the study, a few limitations were met. The main constraint of the study was the lack of data and information regarding the lifecycle of plastic within Sri Lanka. It is beyond the scope of this study to look into the trends and patterns of plastic usage and recycling. It is also worthwhile to mention that future studies should focus on these topics to obtain more specific knowledge regarding the recycling scope in Sri Lanka. Another major factor was that the success of this research was entirely dependent upon compliance by recycling companies and there were a few instances where it was difficult to obtain the required information. However, it is noteworthy that the majority of the companies were enthusiastic about discussing the relevant topic and providing the necessary attention for this sector and being cooperative in giving the necessary information that was required.

The same could not be said for the public authorities. Since the data about the current waste management practices needed to be obtained from the public authorities, they were contacted, but regardless of the fact that the Right to Information is a constitutionally guaranteed right of the public, there was a reluctance by such authorities in providing the necessary information.

CONCLUSION

Considering the information acquired through this study, it is evident that the amount of recycling that takes place currently in the Western Province in Sri Lanka is unsatisfactory. It is safe to assume that this situation remains the same for all the other provinces in the country.

The plastic waste crisis is a huge problem that should be given further consideration, especially in Sri Lanka as it is considered a major polluter while being a developing nation and is yet to provide any satisfactory response to address this crisis. The government has the main responsibility for providing a more favorable scheme for efficient recycling. However, the entire censure is not to be directed only towards the government, but rather the public as well, as it is a collective responsibility. The lack of eagerness to change to alternatives and the social irresponsibility of most individuals could be highlighted as significant factors affecting this issue.

Although the recycling situation in Sri Lanka lies at an unsatisfactory level, there are positive trends to encourage plastic waste recycling. Almost all of the recyclers examined in the research have engaged in these ventures by identifying and realizing the importance of environmental protection as the first and foremost consideration and integrating sustainability in their process. It is both the responsibility of the government and the consumer to be more aware to assist the recyclers towards the goal of making Sri Lanka a better, cleaner, and more responsible country.

KEY



Plastic Resin Code -1



Plastic Resin Code -2



Plastic Resin Code -3



Plastic Resin Code -4



Plastic Resin Code -5



Plastic Resin Code -6



Plastic Resin Code -7

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