

**"A study on solid waste management in Kochi Corporation"**

**Dissertation submitted to  
Mahatma Gandhi University, Kottayam in partial fulfillment of the requirement for  
the degree of  
Master of Social Work  
Specializing in  
Community Development**

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## **CERTIFICATE**

This is to certify that this dissertation titled "A study on waste management in Cochin Corporation" is a record of genuine and original work done by Abel Joseph martin, Reg. No 210011034040 of IV semester Masters of Social Work course of this college under my guidance and supervision and it is hereby approved for submission.

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## **DECLARATION**

I Abel Joseph Martin hereby declare that the research work titled “A study on waste management in Cochin Corporation” submitted to the M G University, Kottayam, is a record of genuine and original work done by me under the guidance of Dr. Elsa Mary Jacob, Assistant Professor, Bharata Mata School of Social Work Thrikkakara, and this research work is submitted in the partial fulfillment of the requirements for the award of the degree of Master of Social Work specializing in Community Development, I hereby declare that the results embedded in this research have not been submitted to any other University or Institute for the award of any degree or diploma, to the best of my knowledge and belief.

## **Abstract**

The research was to understand the waste management in Cochin Corporation. The main aim of the research was to understand the issues in the Kochi area and make a proper plan for the waste management issue in the area. Through the research the researcher aimed to understand the demographic structure of the area, to analyze the solid waste management practice in the area and to do a stakeholders analysis of the area. The data was taken from the Cochin corporation limit and about two fifty seven samples in the area were collected which include houses, apartments, shops etc. The methodology that was used for the research was a quantitative method and data collection semi structured survey was used to obtain the data for research. The data was interpreted using pie charts, bar graphs etc. After the data was studied the researcher was able to suggest a plan for waste management in the area.

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# **Chapter 1 – Introduction**

Waste according to the UN are those materials that are not prime products (that is, products produced for the market) for which the generator has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose. Wastes may be generated during the extraction of raw materials, the processing of raw materials into intermediate and final products, the consumption of final products, and other human activities. Residuals recycled or reused at the place of generation are excluded. See also biological waste, solid waste, industrial wastes and household waste.”(UN statistic division) Waste can be described as undesired and unusable materials, which is considered as a useless substance. It can also be defined as any substance that is dumped after its primary use, or there is no further use with it, these items are called as waste. Waste can be of two types Biodegradable and Non-Biodegradable. Biodegradable waste are those type waste that are mainly produced at home like kitchen waste, food waste, garden waste which are generally known as moist waste. These kinds of waste are generally decomposable in nature i.e. over time they get dissolved with nature i.e. the soil and the byproduct that is obtained can be used as manure. Non-biodegradable waste are those items like broken glass pieces, plastic items or those items that cannot be reused. These types of waste items do not decompose and thus they can be called as one of the main reasons for pollution. The main reason why waste becomes a major issue is because of improper methods of waste disposal. Improper methods of waste management starts from our own home itself, i.e. lack of segregation. Every household should practice segregation of waste. Segregation of waste means that both biodegradable and non-biodegradable waste should be separated and should be handed over to the concerned authorities who are assigned for waste collection. For effective waste the best method that can be adopted is waste management at source. Waste management at source basically means segregation and posing the waste at its generating point i.e. by segregating biodegradable and non-biodegradable waste using two different bins. The next method is disposing of waste and this can be done by using different methods like bio gas plant, bio composting post or simple methods like pit composting where all biodegradable waste can be composted. The best way of handling non-biodegradable waste is by separating those items that can be recycled and non-recycled waste. The items that can be recycled can either be used at homes for decorating or for other purposes like using old glass bottles as flower vases, plastic bottles can be decorating as well as gardening and old tires can be used as seating. The other non-biodegradable items like plastic covers should be properly cleaned and given to Government appointed agencies or people for proper disposal.

The segregated non-biodegradable waste is generally handled by staff who are appointed by the Government. The items are taken care of by the Government and followed by that, these items are disposed of at waste management plants. In the case of Kerala, the waste is collected by Haritha Karma Sena who are taken care of by the LSGD. The people working in Haritha Karma Sena are either Kudumbashree members or those who join directly as the Haritha Karma Sena. The waste collection in Kerala is as per the following rules and acts they are:

- The Plastic Waste Management Rules, 2016
- The Battery (Management and Handling) Rule, 2001
- The Hazardous and Other Waste (Management and Trans boundary Movement) Rules, 2016
- The Bio-Medical Waste Management Rules, 2016
- The E-Waste (Management) Rules, 2016
- The Water (Prevention and Control of Pollution) Act, 1974
- The Construction and Demolition Waste Management Rules, 2016
- The Solid Waste Management Rules, 2016

The waste management in Kerala follows a decentralized system of waste management except in some corporations. In a decentralized system of waste management the waste is usually managed by the Haritha Karma Sena, where they collect the waste segregated and then dispose of the waste in a shredding unit or the areas that are allocated at each Corporation or Municipalities, during years back the landfill was used for disposal of waste. Decentralized Solid Waste Management (DSWM), as developed in Kerala, is a system that involves separating and processing garbage as much as possible at the source before being dispersed throughout the community. In this system, waste that is both biodegradable and not is treated using various techniques. While there are numerous ways to treat biodegradable garbage, including composting and biomethanation, non-biodegradable material is gathered and made available for recycling procedures. By minimizing associated problems, these factors significantly minimize the amount of waste that reaches disposal sites. In addition to being environmentally friendly and economically feasible, the decentralized system has received praise for helping to enhance the living and working conditions of waste collectors. As years passed the landfill model of waste disposal was stopped, and new models of waste disposal were started like shredding units, recycling units, big compost pits etc. The LSGD

in collaboration with the Corporations and Municipalities also distributed waste management tools like bio-compost bin, bio gas plants that can be used for proper disposal of waste. The big challenge the Kerala state had to face was the issue of open dump yards and open landfill areas where waste was disposed, there was no proper care given to these areas which created many challenges including the spread of disease, pollution of the groundwater, open fire in the area etc. Some of the popular landfill dumpsites are Vilappilsala and Bhramapuram.

The Vilappilsala was 12 acres of land which was located at Trivandrum. The land was converted into a waste plant during the year 2000, which could handle up to 157 tons of waste. But as years passed the waste that was collected in the area was more than the capacity which affected the working of the plant, gradually the working of the plant started to slow down and thus the waste in the area was not properly disposed of which made the plant into a landfill. The people in the area and also from the surrounding areas also used this point as a dump yard. Even though the waste in and around the city and the district was disposed of, it gradually became a problem to the people who stayed near the Vilappilsala area. As there was no authority to keep check on the area, the landfill became a great problem to the people lived in the surrounding area, as the waste was not treated properly it started to decompose in the open area causing many disease and health issues to the people living around the area and thus a protest was started where many people participated in the protest to close down the plant. The government didn't even mind the protest that was taking place and even didn't address the needs of the people and the authorities even charged false cases against those who protested. Due to the large protest from the people in the area, the plan was closed in 2011. But after the closing the people started to dump waste in open places which caused even much trouble for the authorities.

The Bhramapuram waste plant is a 37 acre plant which is located near Kochi town. The land was purchased by the Government of Kerala for starting a waste treatment plant. The waste treatment plant came into action in 2007 and the plant was set up under the JNNURM Project of the Government. Even though the plant was working during the initial days, with two years after inauguration, the plant did not work properly because it didn't work properly because of lack of maintenance, outdated design and technology and high amount of waste produced by city all lead to the shutting down of the plant. The flow of waste continued to the area, and within a short period the amount of waste in the area increased at a high level and as a solution for this they planned to start a new plant using enzymes which could break down the waste materials that were called

legacy waste but the plan became unsuccessful because of some reason. The people living in the locality had filed a case against the plant and also the LSGD stating that the plant was not working and also did not segregate waste and the case was given to National Green Tribunal, even after this, the plant was not functioning. In 2017 a thermal gasification plant was proposed but couldn't successfully implement it and thus the official stated that a new plant needs to be started in order to treat the legacy waste as well as the waste that are produced in the area and the officials also imposed a fine of 1Cr for the Corporation for the delay and for the confusion created them. As a next move the Corporation placed an order for two shredding units and one bailing unit, but could not succeed as there was no demand for chipped plastic. Till the day the plant caught fire many plans were taken in order to find a solution for the issue but nothing could be done to solve the issue, and that's when the plant got fire in 2023, which was the starting of the next big issue.

Before the Brahmapuram caught fire, all the waste of the Cochin Corporation was taken to the Brahmapuram plant. The Cochin Corporation followed a centralized system of waste management, where all the waste was taken to the plant without any segregation or proper methods, i.e. all the waste that was produced in the area was not even properly taken care of before disposing. The waste collection was done by unorganized workers, i.e. they were not under the control of Corporation, which was an advantage for them because they could collect any amount of money from the residence and also they didn't follow any time or pattern for waste collection, it was all done according to their convenience. The people under the Cochin Corporation were also very much advantageous because they need not segregate the waste, they just directly gave it to the waste handlers. All this waste was taken to Brahmapuram and without segregation the waste was dumped in the area which made it into a huge dumpsite. One fine day the Brahmapuram plant caught fire which affected the waste management of the entire Kochi area. The fire was out of control and it was put under control one and half months later after the incident. During all this time the waste was not collected from the area, which even made the situation worse. The people started dumping the waste in roads and empty places because no longer was the waste taken by the plant and all these lead to the serious waste management issue in Kochi. The High Court of Kerala imposed a large sum of fine to the Cochin Corporation for the irresponsibility they had shown in the case of waste management and order the solve the issue with in June and also stated that from June the Brahmapuram plant will be closed and no further waste shall be taken to the area till a proper plant is being set up in the area. The Corporation was under great pressure and

then decided to find remedies for the problem which was started by making the waste management of Cochin Corporation decentralized, that means the waste collection be made under the control of the Cochin Corporation. For making all this possible the corporation had to call all the unorganized waste collectors and then make them under one roof that is making them part of Haritha Karama Sena. The next task was to make a plan for waste management and this was done by promoting waste management at source. Every ward under the corporation was provided with a container which they can convert to mini MCF and also were asked to find a solution for the disposal of biodegradable waste. There are many innovative ways by which waste management can be done in an effective way, one such model is the Thumboormuzhi model of waste management, is type of aerobic waste management where all the biodegradable waste from the area will be collected and then will be dumped in these bins which are made of sell or such kind of hard materials. The bin in which the waste is dumped is a box shaped structure which has a gap in between, which helps in the passage of air, before the waste is being dumped the bin is filled up with leaves and then mixture is added which produces the worms that eat up the waste, after the waste has been fully composed the byproduct is obtained as manure. The manure can be resold and from this profit can be made. This was first implemented in Thumboormuzhi, a small village in Alappuzha district of Kerala and because of this, this model is called as Thumboormuzhi model of waste management. There are also other models like bio compost pit that was dug under the flyovers and the motive behind was to dump all the segregated biodegradable waste will be dumped in these pits and then it will be composed using the help of bacteria's and the by product will be obtained as waste items. Some of the big convention centers that are located in Kerala give their biodegradable waste items to pig farm where the waste is being feed to the pig and some others have huge biogas treatment plant where they dump all the food waste into the plant and once the waste is completely decomposed, it produce gas which can be used for cooking and the gas plant also has an outlet from which manure can be obtained. Some houses that are located around the city area have their own system of waste management where they dug up a pit and all the biodegradable waste are put into these pits and they get naturally decomposed. Some others have created their own bio compost bin by recycling the old plastic items and then they are covered into bins and then the waste is put into these bins and because these all have byproducts, these can be used as manure and because of this they set up small garden behind their homes and this manure can be used as manure in their garden. The LGSD, with the help of the Corporations and

Municipalities have started distributing bio bins, composting units of different size, biogas plants etc. for the household to promote waste management at origin.

Private agencies have a large involvement in the field of waste management. There are many agencies like NORTHAMPS, Green Worms, Green Kerala Company which are some of the private agencies that are involved in waste collection and disposing of the waste through proper means. These agencies come and collect waste from the designated area and what these agencies do is they collect waste materials into their plant where the segregated waste is managed with the latest technology and also the by-products that are produced are taken by those big industries who are in need of such waste and the use it for their production activities. There are some NGOs like Goonj who collect old clothes from the people and they use these clothes for making mattresses and floor mats. All these agencies have a professional attitude towards the waste management and also they use all their skill for the responsibility of disposing the waste. There are also new Apps like 'AKKARI app which has a well-organized system of waste management, where the people can download the app from play store and they can install it in their phone. After the process of installation they will have to register in the app using their name and other details and once they have registered they can start the usage of the app and once the app start to work they can use the facilities and the person or the agent come in their vehicle and they collect the waste and they take it to their plant. These days as technology has got there are many ways by which plastic items can be recycled. The plastic items that are collected from the areas are taken to the factories, thy factories are those type of factories where the plastic waste items are turned into plastic tiles that can be used for flooring, roofing etc. and also they there are some factories that make boards that can be replaced with gypsum board and other such kind of materials, what these factories do is they collect the plastic items and they shred these items using the machines and then they melt these items into liquid form and these liquid are then poured into the specific mold and thus the product will be obtained. One of the new trends that are followed these days are the making cafes and hotels using recycled items and these are called upscale cafes, where they use items like old tires and old steel can as seating and table and also use old bottles for planting indoor pants and other items. Some of the youth organizations and other clubs are using such ideas where they renovate bus stops using plastic bottles and tires.

The governments also have such units and one such unit is the bailing unit which compresses plastic waste into blocks and then they are sent to those who are in need like the factories. The

government also has the RRF unit where all the waste are brought with or without segregation and then these items are segregated by the workers and they are sorted out and then they are sent to a bailing unit and then bailed. The next initiative is the starting of MCF where the officials of Cochin Corporation had bought containers from the Cochin Shipyard. These MCF are small Material Collection Facility Center where waste is collected, segregated and stored here and then they are taken to the RRF. These are some of the initiatives of the government.

The Haritha Karma Sena is the backbone of the waste management system as they are the ones who walk around the area and collect the waste from the area to keep our surrounding clean and healthy. The Sena members are facing a lot of problems because they are not being treated very well and also they are not provided with the needed facility. They are still using the old tricycle which they have to push around and collect waste from all the area which makes it very difficult for them because by pushing these carts around, it causes much stress and also other physical issues. They also don't have the proper uniform and safety equipment which they have to use while they work.

The awareness on waste management is very important and the best way to tackle this problem is by giving awareness and education to the people and the best method is by using IEC tools i.e. Information, Education and Communication. The awareness can be given too many methods like beautification, wall paintings, clean drives etc. by involving the public. Even though waste management is an issue it can be solved by using proper planning, organizing and giving proper guidance and awareness to the people.



# **Chapter 2 – Review of Literature**

The concept solid waste management means the complete process of collecting, treating and disposal of solid waste which are collected from different sources and are disposed through proper waste management techniques like collection, transportation, treatment, analysis and disposal. Improper disposal of solid waste can lead to many health hazards that can lead to many serious health issues. Waste management had become a relevant issue these days after the Brahmapuram caught fire, which affected the function of waste management in the Kochi area. After the shutting down of the plant, the major issue the people in the area had to face was the disposal of waste as the waste management system was fully stagnant, which led to the increase of dumpsite in and round the city. Before the Brahmapuram issue Kochi had a centralized system of waste management, which was very much disorganized. For solving the waste management issue the main step that needs to be adopted is a decentralized system of waste management and also to make it an organized system. The study aims to address the issues in the area and also to suggest ways by which all these problems could be addressed as part of which a study on the waste management should be done and the best solution should be derived. (Kulkarni, S. J. (2017). *Aerobic Composting - A Short Review. Git-india.*)

Solid waste management is a major problem in our country due to the lack of proper waste management facilities and services. Most of the high-income countries have serious problems because of landfill-based approaches, which is a method of waste management systems, where waste is emptied in unused or barren land. Dumpsite was one of the first methods by which waste was disposed of by humans as it was one of the most convenient and cost effective methods of waste management, even in some places ocean bed and river beds are used for waste dumping. The main reasons why people dump waste in land areas are because of lack of awareness, governmental policy, political issues, improper planning in waste management, poor waste management infrastructure and social behavior of the people. Different waste management techniques and the issues that are caused by these dumping methods are also highlighted. The challenges that are faced can be easily solved using new technologies and ideas and als by using cost effective methods and seeking suggestions from the common people. The current gaps and new opportunities for effective waste management can also be seen followed by waste prevention and sustainability. (Singh, S. (2020, December 4). *Solid Waste Management in Urban India: Imperatives for Improvement.*)

Waste bank is a new concept which was put forward by Indonesia, a system where the household waste management was done to solve the existing waste disposal issue through community participation. The concept willingness to accept was used as a main tool in addressing the problem and this concept aimed to provide incentives to people who recycle the waste materials and handing over these to the waste bank.(Amalia, S. (2019, November 9). Social Capital in Community-Based Waste Bank Management. *JURNAL ILMU SOSIAL*, 18(2), 93–108.)

Informal waste management systems is a form of waste management practice that is followed in many countries and usually is used as a parallel form of waste management systems.it can also be used in urban as well as rural areas, and also is believed that this type of waste management was a result of urbanization. The main discussion is on how the informal sector is developing and growing as an important part of the waste management activities. After the increase in the development of the economy, there is a gradual shift of waste management from informal to formal actors and the shift is largely seen in urban areas. (Guibrunet, L. (2019, March). What is “informal” in informal waste management? Insights from the case of waste collection in the Tepito neighborhood, Mexico City. *Waste Management*, 86, 13–22)

Solid waste management means the generation of waste, storage, collection, transportation, processing and final disposal. Even though India is one of the largest countries in the world, it does not have enough resources or proper system to manage the waste produced in our country. India being a large country with growing population and fast developing, the greatest gap and the greatest challenge is proper waste management system. Municipal solid waste management can be used as an effective method of waste management in our country with the increasing amount of waste. If proper measures are not taken for waste management, there is a great chance that it affects the health of the public, environment pollution, climate change, depletion of natural resources and also the quality of life of the public.(Narayana, T. (2009, March). Municipal solid waste management in India: From waste disposal to recovery of resources? *Waste Management*, 29(3), 1163–1166)

Solid waste management is considered as one of the most critical issues that affects our environment. Most of the countries around the world also face issues with solid waste management. It is seen that the amount of waste produced and rate of population growth is moving in a direct proportion manner. The need for solid waste management in an area is to keep it clean by managing the waste that is generated in the area, which helps in promoting public health care

and ecology of the area. Solid waste management is considered as a major issue by most of the municipalities, because collection of waste is considered cost consuming, has no proper management system and also because there is no proper administration. It is the responsibility of these governing bodies to clean the streets, transport and the proper disposal of waste. If the collected waste is not being properly disposed of it can affect our ecology and environment. If the waste is not disposed of properly it can get rotten and can attract insects, which can cause infectious diseases such as typhoid, plague, dysentery etc. Waste disposal problems are increasing day by day and the amounts of wastes generated by our cities are very high and it is very difficult to find sites for new processing and disposal facilities.(Bhatia, A., & Sharma, S. (2023, December). Identifying determinants of household food waste behavior in urban India. *Cleaner Waste Systems*, 6, 100105)

The main reason for the increasing amount of solid waste is because of the high rate of population and also the ineffective management of these waste. For effective waste management the sources and components of solid waste should be identified, the type and the quantity of waste disposed of, methods of waste disposal and effect of improper waste management on health should be taken into consideration. If the liquid waste and solid waste from households and communities are not properly disposed there is a great chance that these waste can become a serious health hazard and which may lead to serious spread of infectious diseases. Waste production increases every year due to population growth, non-sustainable lifestyles. Waste production can be calculated by the amount of waste generated per capita and the total number of residents. Recycling is a DPSIR indicator used to measure the amount of percentage of recycled waste fractions. Recycling means using the same material more than once. Therefore, recycling saves resources and reduces contamination. Pollution from contaminated wastes may affect the quality of drinking water and the level of air pollution. (Gupta, S., Mohan, K., Prasad, R., Gupta, S., & Kansal, A. (1998, November). Solid waste management in India: options and opportunities. *Resources, Conservation and Recycling*, 24(2), 137–154)

E-waste is one of the fastest growing waste materials in India. The handling and disposal of these waste are mainly taken care of by the informal sector, and because there is no proper regulation on this, there is every chance that it can become a threat to our environment and also a threat to the people who are collecting waste. The techniques used for management of E waste have no well-developed plan or protocol, and also in India we don't have a formal system of E-waste

management and also recycling units. The main gap that is identified in the case of waste management is that it doesn't have policies as well as proper infrastructure facilities. The best way to resolve these gaps are by developing policy changes, improvements in the existing infrastructure as well to address the increasing amounts of e-waste being generated.(E-WASTE RECYCLING ISSUES IN INDIA. (2017). *International Journal of Latest Trends in Engineering and Technology*, 8(2))

Swachh Bharat Waste Park was a concept that was put forward by Umesh, a resident of Vengurla, Maharashtra. The town adopted a waste management system where about 15000 people decided to segregate and dispose of their waste at source level and also it is the only town to generate income out of waste. The person behind this initiative was the chief officer of Vengurla and who believed that all this would happen only with the help of public participation.

The town banned the use of plastic bags under 50 microns, made by-laws for waste management and fined those who litter and those who did not segregate. There was also a community awareness for the public as well as for officials. They appointed sanitation workers who worked according to the schedule and plan, and also provided dustbins for every household. The dump yard was converted to a waste park with a biogas plant, segregation yard, plastic shredding unit, fruit trees and organic farm. (Begum, S., & Chavan, V. K. (2022). Swachh Bharat Mission Impact on high School Students. *International Journal of All Research Education & Scientific Methods*, 10(06))

One of the major ecological issues that nations are facing today is the challenge they have in the removal of waste and a proper system for it. Since the development of technology and increasing population waste has been a significant environmental issue. Other than the waste that is produced at school, home, market, and other public spots, there are also other sources which produce waste like those from enterprises, clinics and different sources. Most of the waste like food waste, paper etc. are biodegradable and metals, aluminum jars, plastics, broken PCs, and vehicle parts are non-biodegradable, because they don't rot effectively and they will fill up in landfills and they cause damage to the water, land, and individuals around it. The absence of productive waste administration rehearses wellbeing dangers, unattractiveness, gridlock, blockage of seepages, and obnoxiousness. The issues of waste removal are becoming intricate as populace and modern creation increment and subsequently squander age has likewise expanded. Because of the quick development of the populace, strong waste administration has become especially troublesome

today. (Mastakar, P., Mastakar, V., Mukhopadhyay, K., & Jaju, S. (2019). Zero Waste Circular Model of MSWM: A Success in Ward 40, Pune, India. *Metamorphosis*, 18(1), 36–56)

A typical wellspring of nearby natural contamination is the disintegration of waste into constituent synthetic substances. Natural norms are met by not many existing landfills on the planet's least fortunate nations and with restricted financial plans, there are probably not many locales thoroughly assessed before use from here on out. The gas delivered by deteriorating trash is a significant natural concern. Methane, the side-effect of the anaerobic breath of microbes, and these microorganisms flourish in landfills with high measures of dampness. At greatest anaerobic deterioration, the methane fixation can reach up to half of the creation of landfill gas. One more issue related with these gasses is their commitment to the upgraded environmental change and ozone depleting substance impact. There is a variety of the fluid leachate the board all through the landfills of the creating scene. A danger is presented by the leachate to nearby surface and groundwater frameworks. The ideal procedure to contain abundance fluid is the utilization of thick mud stores at the lower part of waste pits, combined with plastic sheeting-type liners to keep away from invasion into the encompassing soil. Thus, along these lines, the waste instead of invasion is urged to dissipate. (Sharholly, M., Ahmad, K., Mahmoud, G., & Trivedi, R. (2008). Municipal solid waste management in Indian cities – A review. *Waste Management*, 28(2), 459–467.)

To guarantee that it doesn't influence the climate and not cause wellbeing risks to individuals living there, appropriate strong waste administration must be attempted. Appropriate isolation of waste must be finished at the family level and it ought to be guaranteed that everything the natural matter is saved aside for fertilizing the soil. Without a doubt, this is the best technique for the right removal of this portion of the waste. The natural waste can be treated the soil and afterward utilized as a compost. These means might be taken for the avoidance of effect on climate and humans. Recognizable proof names and codes to make reusing and arranging of plastic bundling simpler. Districts ought to expand their degree of administration to general society with respect to the arranging of waste. Advancing the utilization of less unsafe options in contrast to perilous synthetic substances during the development of merchandise. (Pulp and Paper Technology. (2022, April 12). *Impact Of Solid Waste Disposal And Management On the Environment*. Pulp and Paper Technology.)

Strong waste administration (SWM) has arisen as one of the most monstrous improvement challenges in metropolitan India. Various investigations demonstrate that the hazardous removal of waste produces risky

gasses and leachates, because of microbial disintegration, environment conditions, decline attributes and land-filling activities. As per the twelfth Timetable of the 74th Constitution Correction Demonstration of 1992, metropolitan neighborhood bodies (ULBs) are answerable for keeping urban communities and towns clean. Notwithstanding, most ULBs need sufficient framework and face different key and institutional shortcomings, like poor institutional limit, monetary imperatives, and an absence of political will. While numerous Indian ULBs truly do get government help, practically every one of them keep on being monetarily delicate. India has previously depleted all suitable landfill locales, and the concerned ULBs don't have assets to procure new land. Besides, finding new landfill destinations is a troublesome undertaking as nearby authorities are opposed to saving areas in their purview for squander that come from other areas. (Wilson DC, Velis CA. Waste management – still a global challenge in the 21st century: An evidence-based call for action. *Waste Management & Research*. 2015; 33(12):1049-1051.)

In India, the main methods for getting rid of garbage are still open consuming and waste unloading. The majority of urban communities and towns keep their lost property in low-lying areas outside the city, discarding it. The report of the Orchestrating Commission of 2014 saw that over 80% of the waste accumulated in India is disposed of randomly in dump yards in an unhygienic way, provoking prosperity and regular debasement. “In India, the horrible smell and sight of trash being dumped on the side of the road, sometimes spilling over from channels or drifting on the surface of the waterways, are nothing out of the ordinary. Also, with plugging up of the channels with waste, there is waterlogging and flooding of neighborhood areas, roads and even railroad tracks in the tempestuous season upsetting common life. People moreover litter the streets and public places pointlessly. A generally involved innovation for reusing remaining waste which utilizes ignition to give intensity and power. In India, dumping can be significantly reduced by adopting recycling using this technology. In addition to being an economically viable option for solid waste, resource recovery through RDF significantly reduces the need for landfill space. “would reduce disposal to land and generate clean, reliable energy from a renewable fuel source, reducing dependence on fossil fuels and reducing Greenhouse Gas (GHG) emission,” according to the advancement of this technology. (Sharholy, M., Ahmad, K., Mahmoud, G., & Trivedi, R. (2008). Municipal solid waste management in Indian cities – A review. *Waste Management*, 28(2), 459–467. )

In April 2016, the Municipal Solid Waste (Management and Handling) Rules, 2000 were replaced by the SWM Rules, which were revised and made public by the MoEFCC. The new regulations now apply beyond the municipal boundaries. It permits producers of waste to segregate waste at the source, utilize wet kitchen waste for composting or biomethanation, and distribute dry waste,

such as paper, plastic, glass, and metal, for recycling and reuse. “The material recovery facilities or secondary storage facilities with sufficient space for sorting of recyclable materials to enable informal or authorized waste-pickers and waste-collectors to separate recyclables from the waste and provide easy access to waste-pickers and recyclers for collection of segregated recyclable waste such as paper, plastic, metal, glass, textile from the source of generation or from material recovery facilities” is the task that falls under the purview of the local authorities. Besides, the new principles deny squander generators from tossing, consuming or covering strong waste in open public spaces, outside premises, or in channels and water bodies. In the event of littering and non-segregation, waste producers are now required to pay a "user fee" and a "spot fine" to the waste collector. ULBs are able to create bylaws and establish the criteria for imposing spot fines thanks to the rules. Schedule 1 of the 2016 SWM Rules provides the engineering specifications and criteria for setting up and operating landfill sites. Currently, the rules for waste segregation and recycling are poorly implemented, and many cities have failed to integrate door-to-door collection into the informal sector. The Rules also recommend that biodegradable waste be processed, treated, and disposed of within the premises through composting or biomethanation. Further, the principles don't resolve the issues made by the NIMBY disorder. As per the direction note on MSWM, consistency with the SWM decides that fitting frameworks and foundation offices be set up to attempt the logical assortment, the executives, handling and removal of SWM. The establishment of a Central Monitoring Committee headed by the MoEFCC Secretary was suggested in the Rules of 2016 The overall implementation of the 2016 SWM Rules will be monitored by this committee.(Hoornweg, D. (2012, March 1). *What a Waste : A Global Review of Solid Waste Management.*)

The local experts are generally aware of the health risks and environmental issues caused by poor waste management. They are also looking for better ways to share their traditional responsibilities here with neighborhood networks, small and medium-sized enterprises (MSEs), large confidential businesses, and other partners simultaneously. The public (families) structure the largest category of partners in squandering the executives. Gradually, the local authority may attempt to prepare the entertainers' human and financial assets to generate public interest. To waste the executives' exercises, they have a complicated relationship: as producers of waste, customers of waste management, data collectors, and members in preparation for waste the board and metropolitan disinfection. Families set up their junk with the goal that it will in general be accumulated by



MSEs, the local power or an exclusive business, or by waste pickers, or bought by traveler buyers. Important jobs of house-to-house garbage collection — Chennai's experience Chennai, one of India's four metropolitan areas, has recently undertaken successful efforts to improve garbage collection from house to house. The program's execution with the help of the conservancy staff and local councils was an important part of it. It has made about 90% progress in the past, and similar efforts are currently being made to advance source isolation. (Misra, V., & Pandey, S. (2005). Hazardous waste, impact on health and environment for development of better waste management strategies in future in India. *Environment International*, 31(3), 417–431)

# **Chapter 3 – Methodology**

## **Introduction**

After the Brahmapuram issue solid waste management in Cochin Corporation was affected, as there was no place for the disposal of waste and also the existing system of waste management was a failure. The main problem that the Cochin Corporation had to face was the system of waste management, because the Cochin Corporation was following a centralized method of waste collection, where there was no practice of segregation and also the people who came for waste collection were not the members of Haritha Karma Sena, thus in total the waste management system in Kochi was totally flop. After the Brahmapuram issue, the High Court of Kerala had ordered a stop of transportation of waste to Bhrmapuram and ordered each ward to find a new solution for waste management. The main decision that was taken was to convert the centralized waste management system into a decentralized waste management system and followed that the Cochin Corporation had associated with Suchitwa Mission and other private agencies for finding alternatives. The Project Management Unit of Suchitwa Mission came up with the idea of involving youth for planning an effective waste system. Many different ways were adopted to make the system effective and the technique that was used for waste management was through providing awareness to the local people through IEC activities. The main need for awareness was because during the period of centralized there was no proper system of waste management, all the waste was taken to Brahmapuram without any segregation and the workers who had been working in this field were not organized and also there was no proper data base about these workers. The main mission of the decentralized system was to make a proper plan for the segregation of the waste and also to organize these workers under one umbrella, and the main aim was to teach people in the Kochi area the importance of waste segregation. The research was done at Vennala ward and the main reason for choosing this topic for study was to suggest methods and ways which the waste management could be done properly in an area and also to create a plan for the area so that they can practice the best waste management system. The method of research used here is simple random survey, where 250 houses were selected from 2500 houses in the area through lottery method and for data collection semi structured direct personal interview was conducted to know about the situation of the area.

## **Statement of the problem**

Waste management is one of the major issues that our society is facing. Without proper waste management there is a high chance that it becomes a great threat to our society. The major issues that arise due to improper waste management are the cause of diseases and major health issues. After the Brahmapuram issue the waste management system became inefficient in the Kochi area, and in addition to this the number of dumpsites in Kochi area has also increased. Till the Brahmapuram plant got fire, Kochi was following a centralized system of waste management and also the employees who were into waste collection were not organized. This was the major issue that was faced by the Cochin Corporation.

## **Significance of the study**

As waste management is a major issue that the people in Kochi area face these days, this study becomes relevant because this study aims to provide the best solution for waste management i.e. by adopting new ways by which the waste can be managed using the test technology, machines and also the available man power. As the Brahmapuram plant will be closed till a new plant will be settled it will be difficult for the people for waste management. The study also helps to find the best method that can be used for management of the waste that will be equally helpful for the public as well as the Corporation, as it will be helpful for them to find a solution to the problem.

## **Aim of the study**

The aim of the study is to study the existing problem that is in Kochi and to find a solution for the betterment of the waste management system. The researcher aims to mobilize the community by educating and giving them awareness about how to dispose of the waste in the right manner and also teach them how to properly segregate the waste items that are produced at their homes. The researcher also aims to implement a waste management plan at Vennala area, by promoting waste disposal at origin, promoting the use of alternative products, promoting waste management tolls like biogas, bio compost bins etc. and to start a mini MCF and also ways to dispose biodegradable items using huge compost pits or bio treatment plants and he last motive is to identify the dump

yard and to convert them into places like small hang out area or do wall painting so that people don't again litter those area.

## **Research Objectives**

### **➤ General Objective**

- To understand the solid waste management practices in Kochi Corporation.

### **➤ Specific Objectives**

- To assess the socio demographic profile of the community.
- To understand and analyze the solid waste management practices of the community.
- To assess the perspectives, concerns and challenges of the community regarding solid waste management.
- To do a stakeholder analysis with respect to solid waste management.

## **Definition of concepts**

Conceptual Definition:

1. Socio - demography: the term socio - demographic or social demography was coined by the famous American sociologist and demographer Kingsley Davis, who made a significant contribution to the field of demography by examining the social dimension of the population. It is commonly referred to as social demography, which is a branch of social work that aims at how social and demographic aspects interact. It mainly covers the population's age, gender, and race, and ethnicity, level of education, household income, and occupation, among other social and demographic factors. To understand how these social and demographic elements affect and shape different facets of people's lives, such as their health, social well-being, access to resources, and general quality of life, is the goal of socio-demography.

2. Waste management: Edwin Chadwick, an English social reformer and civil servant, was a key figure in the 19th century's push for better health and sanitary policies. Although Chadwick did not invent the term waste management, his efforts helped to advance methods for handling waste as part of broader sanitary changes. Chadwick promoted centralized garbage collection and disposal systems and the significance of proper waste removal. He also contributed to the creation of formal waste management systems like construction of sewerage systems and proper waste disposal practice.
3. Community: German sociologist Ferdinand Tonnies wrote about Community and Society which was published in 1887. Tonnies in his book claims that a community can be defined by solid social ties, a feeling of common identity, and close, in-person connections between its members. People are linked to one another in a community by interpersonal ties, trust, and a shared set of standards and values. According to Tonnies, a community is a more conventional and natural form of social organization in which social ties are based on kinship, locality, or a shared cultural heritage.

### Operational Definition:

1. Socio - demography: the use of socio- demography in this study was to know about the living condition of the people, as living condition as this factor helps in identifying how well people are able to manage the waste they produce in their homes and also to know whether they are financially sound for spending money on waste management system and also in using alternative. Socio- demography also helps us to understand about the area and also helps us to suggest the ways through which the waste management can be done using the available resources that are available in the area.
2. Waste management: waste management is the focus area of research. The researchers aim to find the best solution for the waste management in the area. This can be done by using the best methods for waste management. The researchers need to find the solution for the waste management using sustainable methods so that these alternatives have a long lasting

effect and also can be used by the future generation and also doesn't create much problem to our environment.

3. Community: the community is said to be the people or the residence of the area. The community is said to be the person who is responsible for the managing the waste in their specific area, the participation of the community is said to be an important factor because, without the cooperation of the community the waste management system will not be possible. The community should also be given the proper measures by which and awareness about proper waste management and also should be given the proper education for the proper handling of waste. The attitude and behavior of the community can be changed through behavior change communication.

## **Research design**

The research design that is used in this study is descriptive research design, and this method was used because the researcher needed to obtain the information from the people residing in Cochin Corporation. The methodology that was used was a quantitative method and data collection semi structured survey was used to obtain the data for research.

## **Universe**

The universe that was taken for the research was the residents of Cochin Corporation, as the study was on a study about the solid waste management in Cochin Corporation.

## **Sampling**

The sampling method that was used for data collection was probability sampling. The population of the research was the entire residents of Vennala (Ward 42) which falls under the Cochin Corporation. The ward had a total of 2500 houses. The sample of the research was 250 houses of the ward i.e. 1/10th of the population was selected. The selection of the sample was done using a simple random sample method and the technique that was used was the lottery method. The researcher also collected data from 10 stakeholders of the area: Counselor, HI, JHI, ASHA (2) worker, local political leaders (2) and Haritha karma sena (3).

## **Inclusion and Exclusion criteria**

### **Inclusion**

The residents of Vennala area were selected for the data collection, out of 2500 houses in the area 250 of them were selected and the samples were elected using lottery method.

### **Exclusion**

The research aimed to study the waste management in the entire Cochin Corporation, but due to practicality only specific areas were selected and leaving the other areas.

## **Pilot study and Pre-test**

The researcher as part of his data collection went to the Vennala area from where the sample was to be collected. The trainee conducted a pilot study in the area to check the feasibility of the data collection. Before the data collection the researcher met the stakeholders and residents of the area to know about the problems they have been facing and to identify the areas where the data collection could be done.

The pretest was done after the pilot study where the researcher selected three houses of the area where a pretest with the survey form was done to find out the flaws the questionnaire had also to know about the feasibility of the study. After the pretest, the researcher was able to know about the drawback that was present and also make necessary changes.

## **Tool of Data Collection**

The method of data collection that was used for the research was Key Information Interview, Focus Group Discussion, Semi Structured Interview and observation.

## **Method of Data Collection**

The tools for data collection which were used during the time of research were KII- Key Information Interview to know about what all was happening in the Kochi area and the information was collected from the stakeholders as well as the residents of the area. Focus Group Discussion



was also conducted among the residents and also among the stakeholders to know about the waste management system and the related problem that existed in the area. Semi structured survey was the next tool used where a survey was conducted at Ward 42 of Cochin Corporation. Observation was also done during the survey, where the main aim of the observation was to check whether there was any active dumpsite, to observe whether there is any type of waste management system like bio compost, bio gas in the area and also to identify the best practices followed in the area.

### **Data Analysis and interpretation**

For the collection of data from the residence of the area semi survey was used and the survey was done using Google form. The response that was received from the residents were recorded in Excel sheet and the received data was analyzed using pie charts and bar graphs.

### **Limitations**

The limitations of the researcher which the researcher could identify was that the sample that was taken for the research cannot be called accurate as the entire universe was not approached for data collection, only 1/10 the population was selected for data collection i.e. out of 2500 houses in the area only 250 houses were selected. As a semi structured interview method was used for data collection the whole of the response was not able to be recorded or communicated because of limitation of time. The researcher had adopted a door to door survey at the area and the response that was given by the respondent was not 100% true because the respondent had intentionally hidden facts because of various reasons and this was evident from the body language of the respondent. As the survey was conducted door to door the greatest challenges were time and the attitude of the people, some of the residents in the area were not cooperating with the researcher, and some of the residents didn't even open the door or respond for the researcher's question.

## **Chapterisation**

- Chapter 1 : Introduction
  
- Chapter 2 : Review of Literature
  
- Chapter 3 : Methodology
  
- Chapter 4 : Data Analysis and interpretation
  
- Chapter 5 : Finding, Recommendations, Implication for professional social work practice

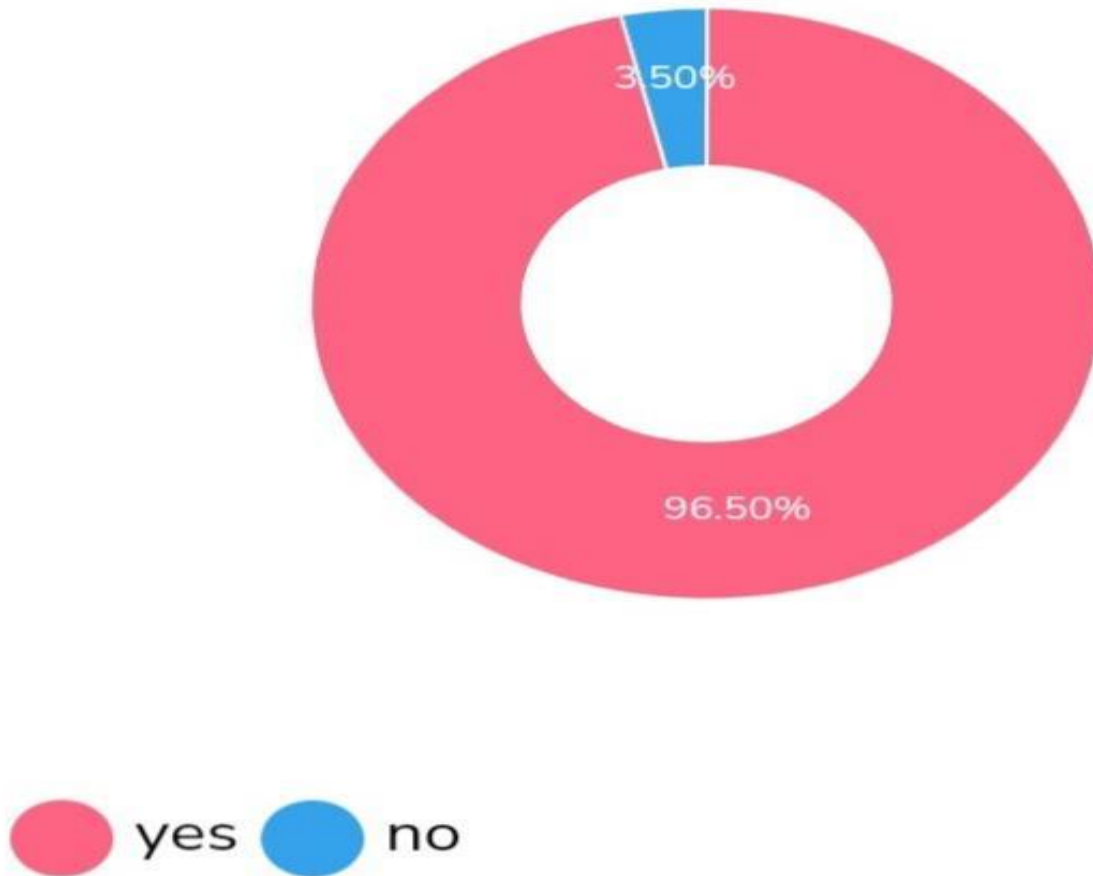
# **Chapter 4 – Analysis and Interpretation**

## 1. Type of building



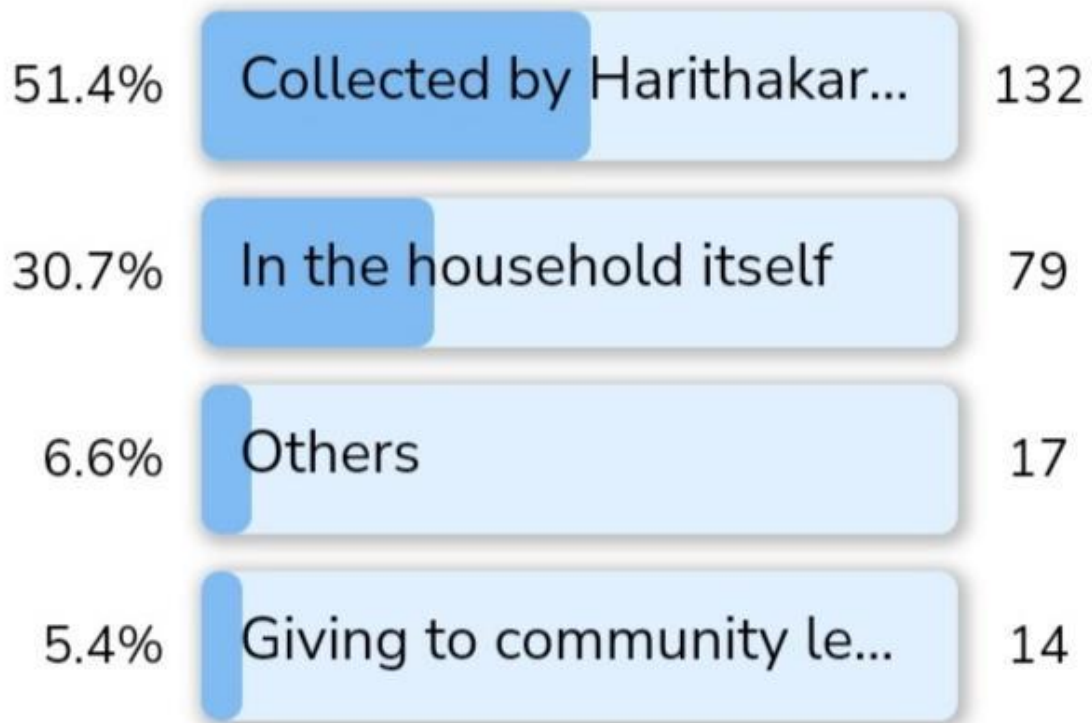
From the above graph we can understand that the number of houses from which the survey was taken was two hundred and five. The total number of residential flats which were included for the survey was thirty seven and the number of apartments where the researcher went was four and the shops from which he collected the data was four. From the given data we can interpret that the number of the houses in the area was very much high compared to other buildings. The area was a residential area as from the data we can see that there were thirty seven residential flats and four apartments. The number of shops was just four.

2. Buildings with building number issued



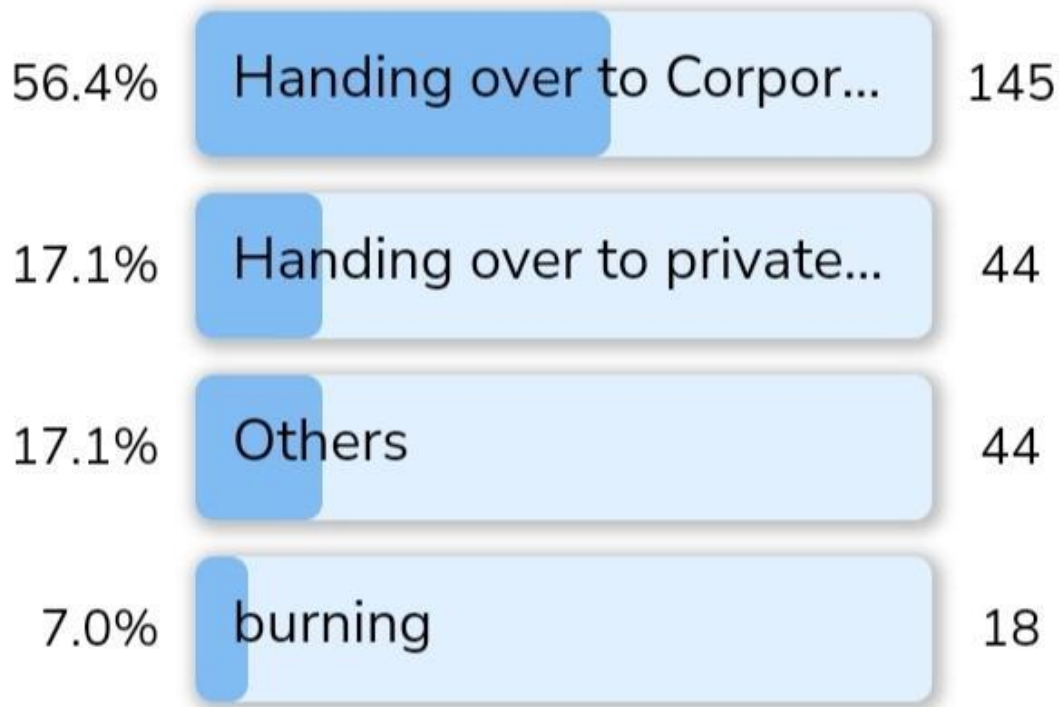
From the above pie chart we can interpret that two forty eight buildings were issued with building numbers and nine houses did not have the building number

## 3. Handling of Biodegradable waste



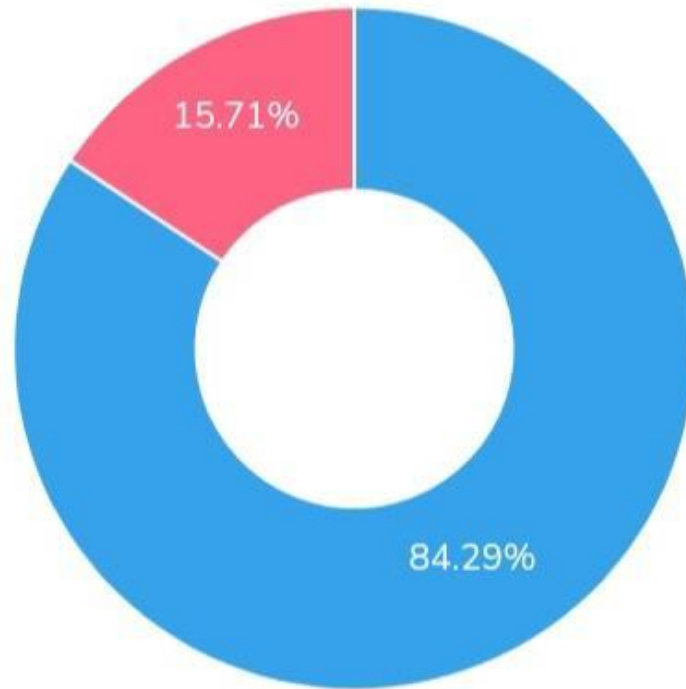
From the above graph we can understand that one thirty two families gave their bio waste to Haritha Karma Sena, seventy nine families disposed of their waste in their own house. Fourteen families gave the waste to community level waste handlers and other methods were used by seventeen families.

4. Handling of Non-biodegradable waste



From the graph we can understand that one forty houses gave their non-bio waste to Haritha Karma Sena, forty four families gave their waste to private agencies, forty four used other methods of waste disposal and eighteen of the families burned the waste.

### 5. Handling of Medical waste

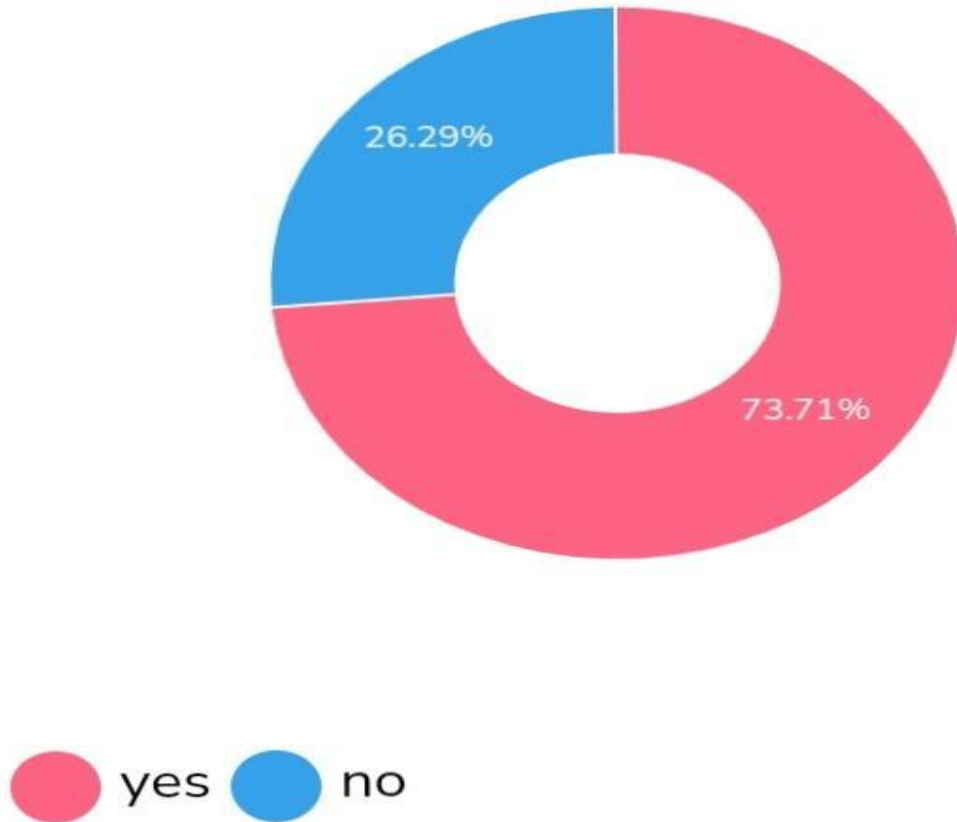


● burning ● handover to corporation

From the pie chart we can understand that about one sixty one families handed over the waste to the collection staff, thirty families burned their medical waste and sixty six didn't respond to the question.

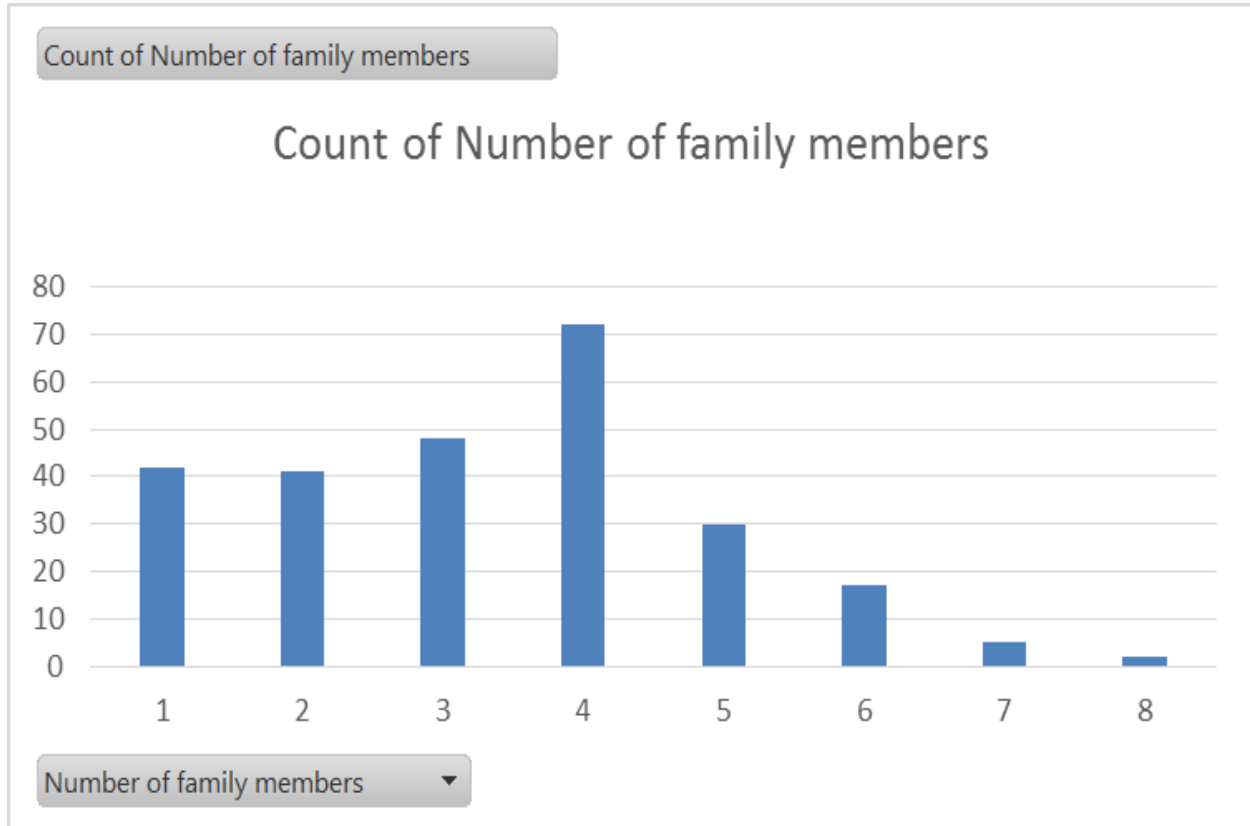


### 6. Satisfaction of Waste Management Process



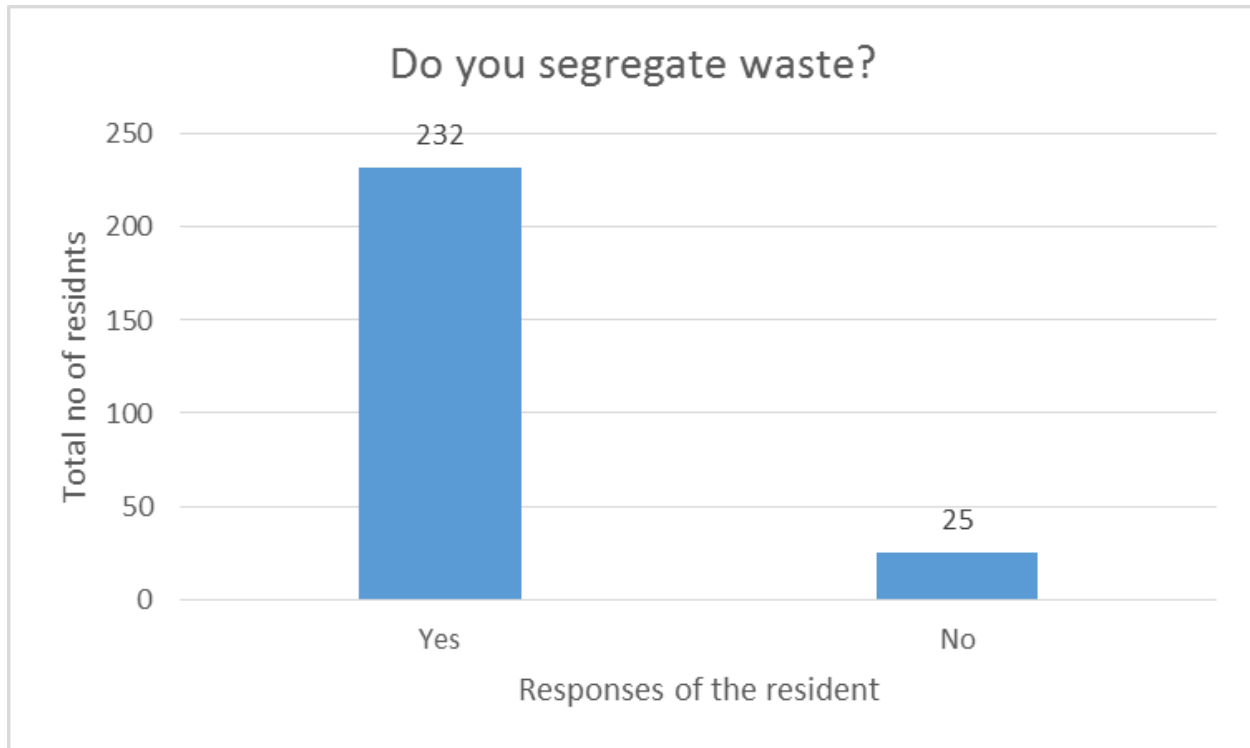
From the pie chart we can interpret that one eighty five families were satisfied with the waste management system and sixty six were not satisfied and six didn't respond.

### 7. Number of Family Member



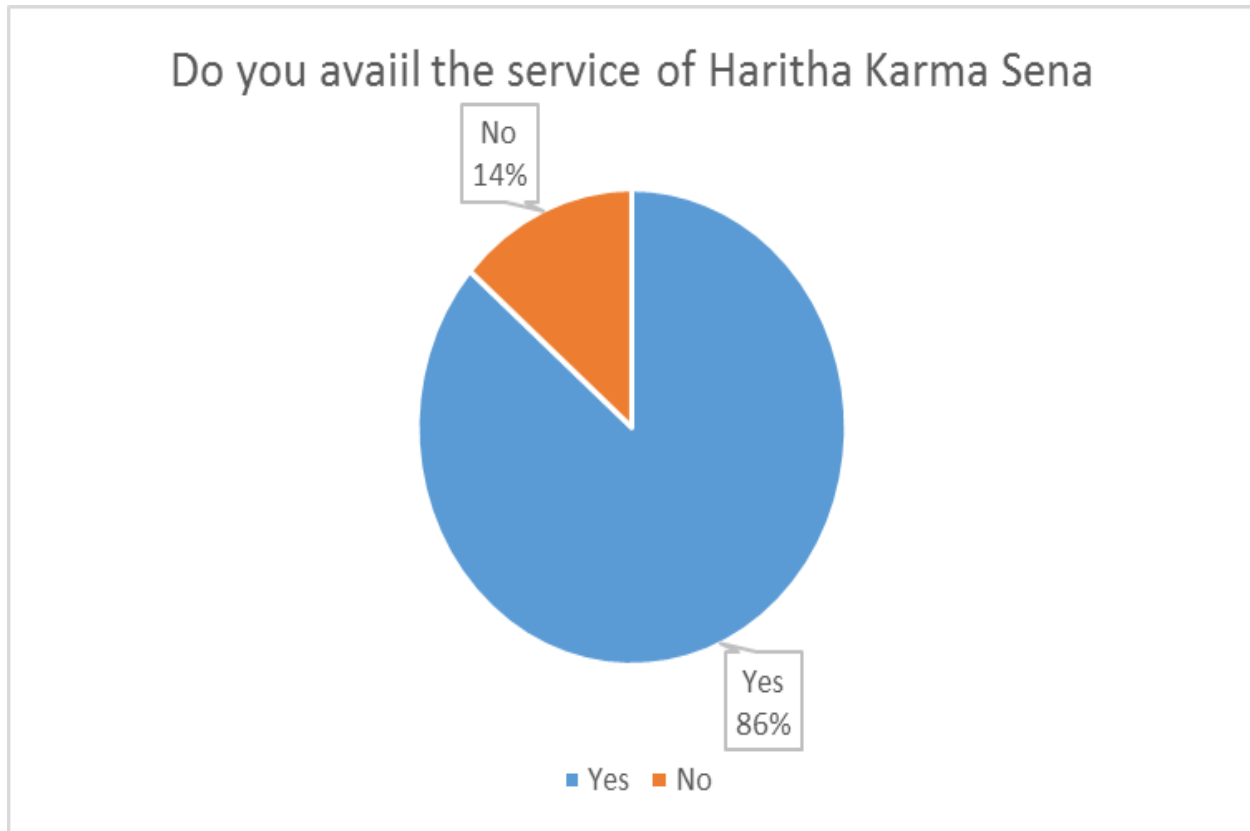
From the above bar graph we can get a clear idea about the family structure. The Y axis shows the no of response and X axis shows the no of family members.

8. Do you segregate waste?



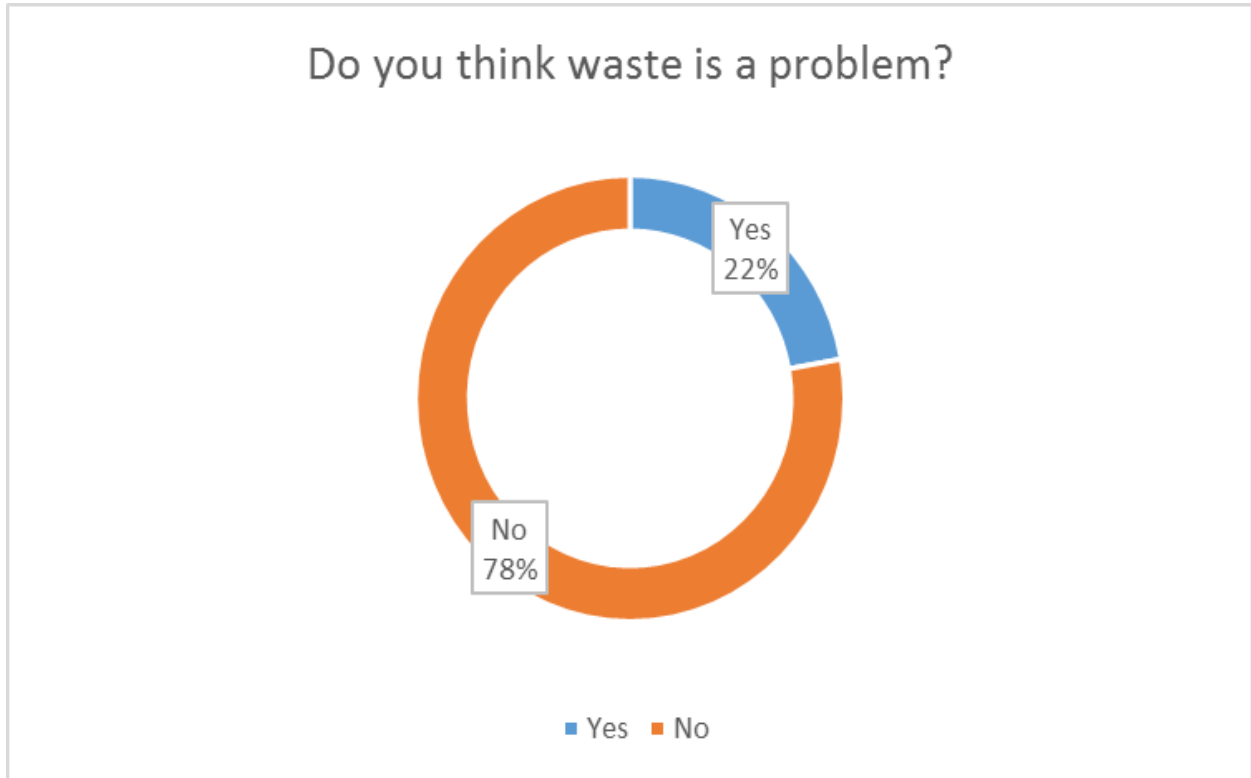
From the above bar graph we can identify that two thirty two residents do proper segregation of waste and twenty five residents do not segregate their waste.

9. Do you avail the service of Haritha Karma Sena?



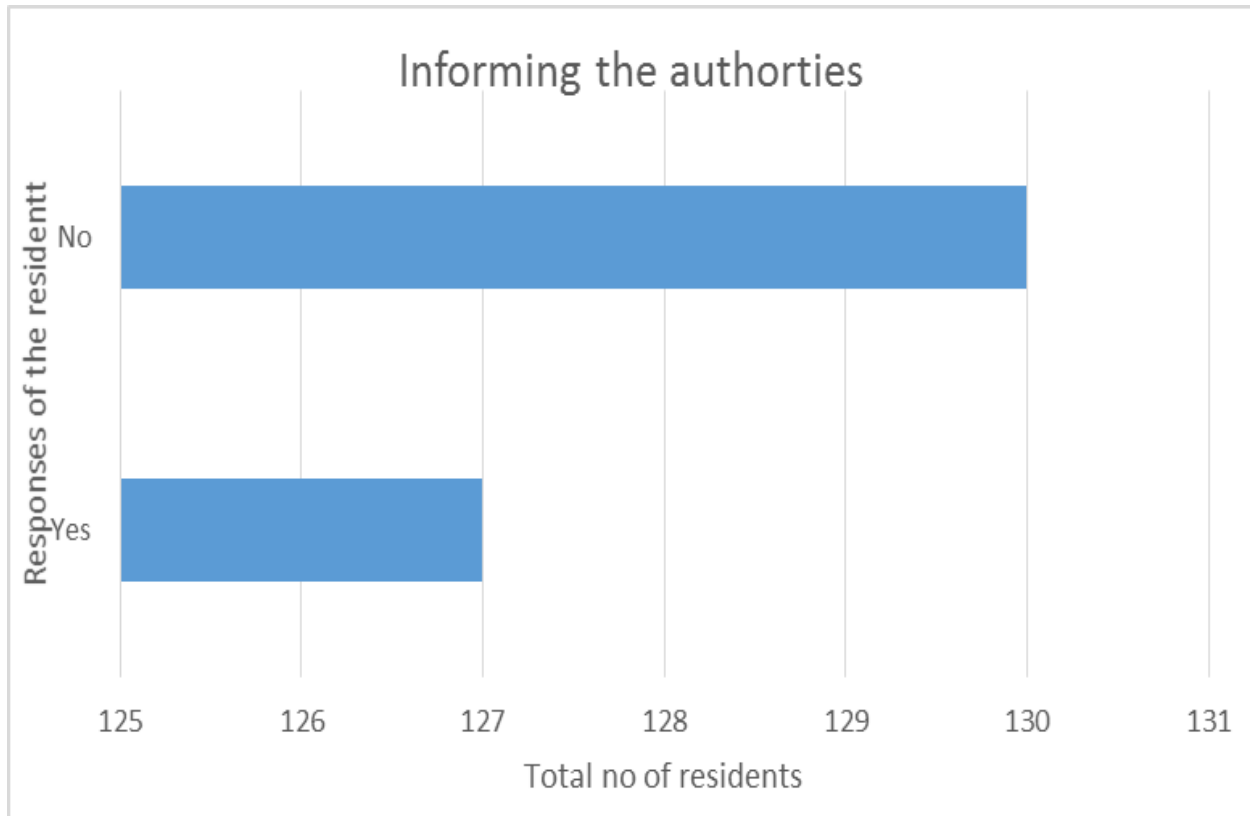
From the pie chart we can observe that two hundred twenty two residents avail the service of Haritha Karma Sena and thirty five do not avail.

10. Do you think that waste is a problem?



From the above pie chart we can understand two hundred people stated that waste was not a problem and fifty seven stated that waste was a problem.

11. Do you address the issue regarding waste management with the authorities?



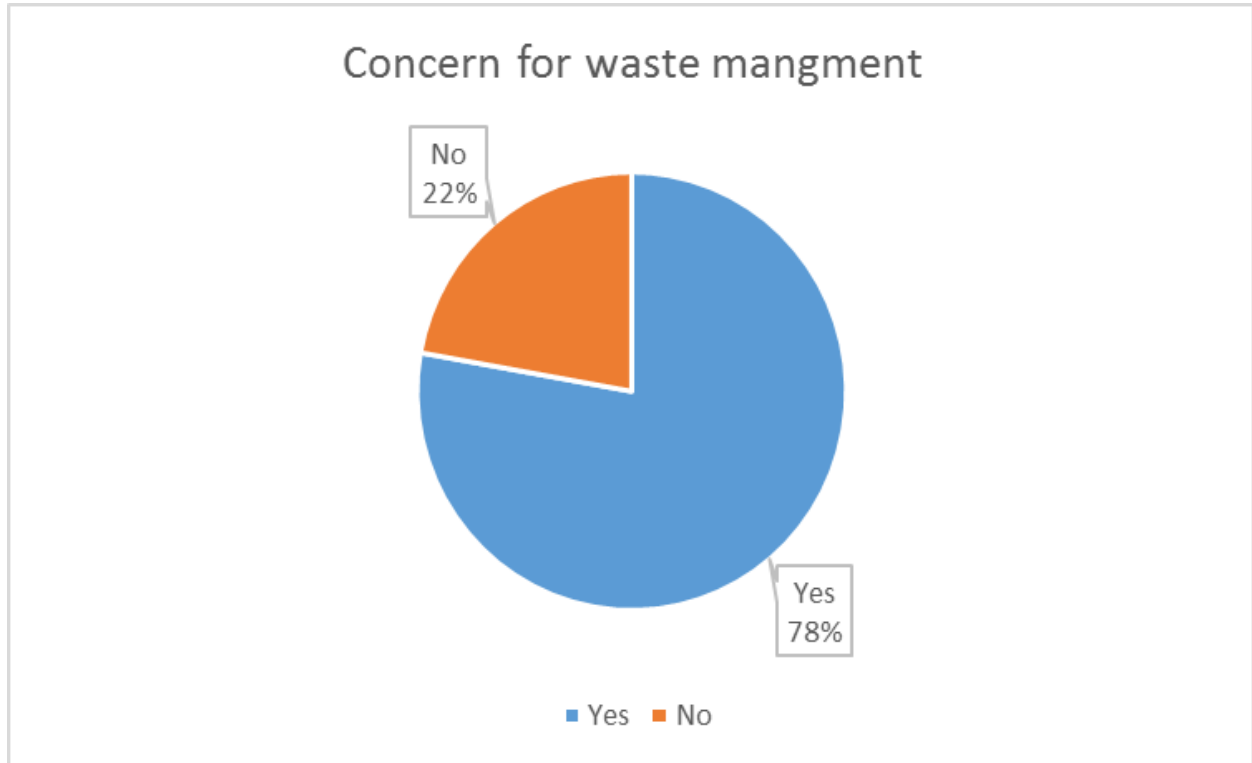
From the bar graph the researcher could identify that one twenty seven residents had informed their concern to the authorities and one thirty didn't tell their concern to the authorities.

12. Do these problems create any challenges or hindrances for waste management?



From the above pie chart the researcher could identify that one ninety seven families said that the problems mentioned during the survey created hindrance for waste management and sixty said that it's not causing any hindrance.

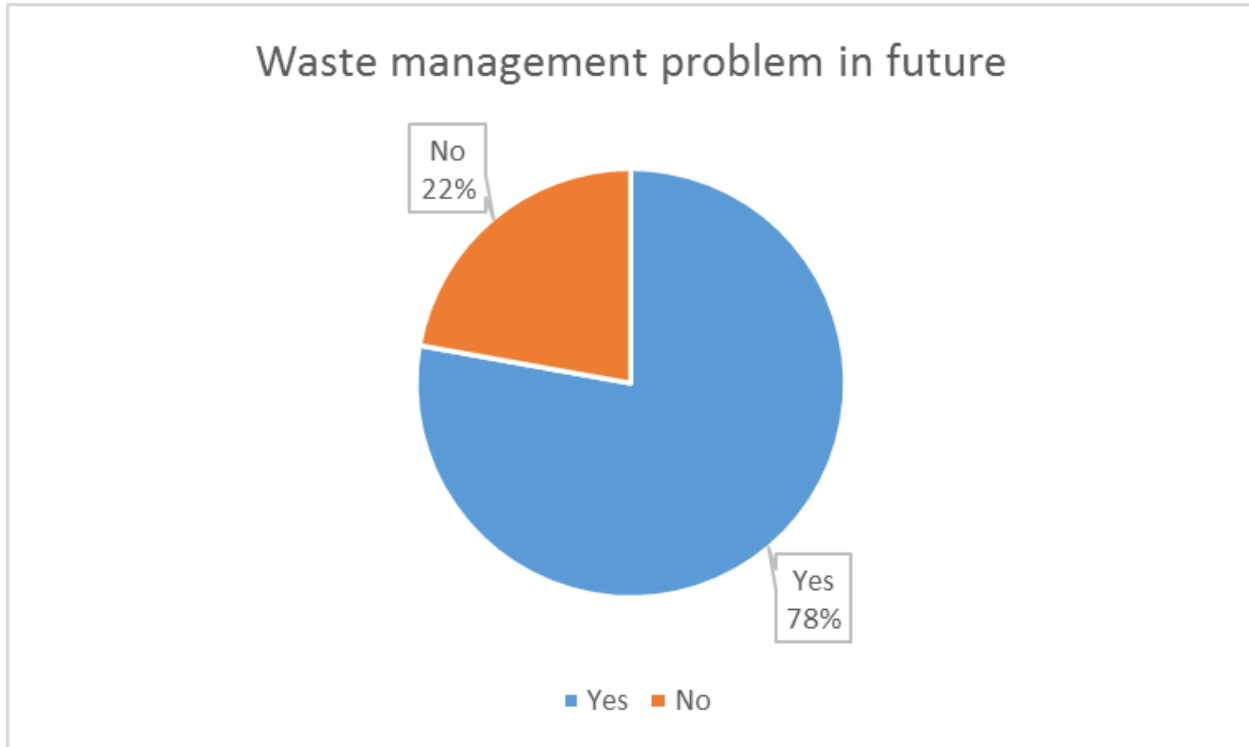
13. Do you have any concern for the future waste management system?



From the pie chart the researcher could identify that two hundred families said that they have concern for future waste management and fifty seven responded that they have no concern.

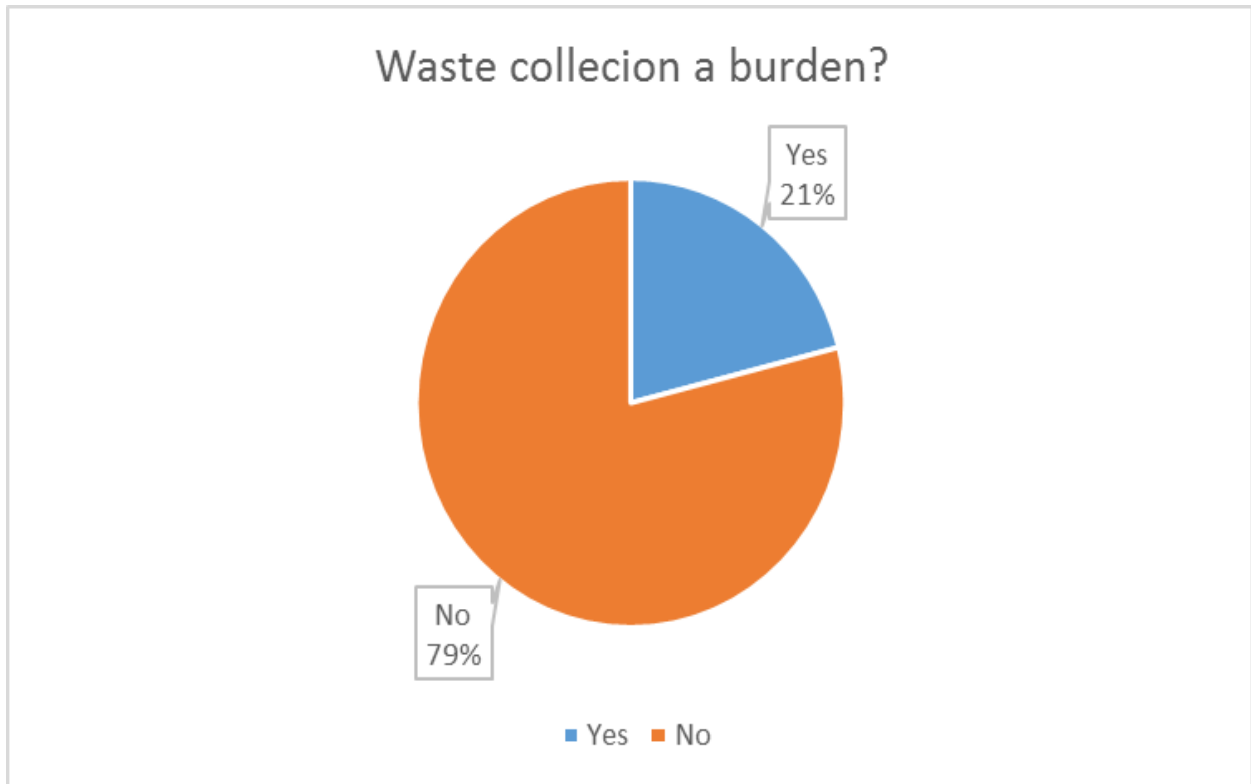


14. Do you think that waste management will be a problem in the future?



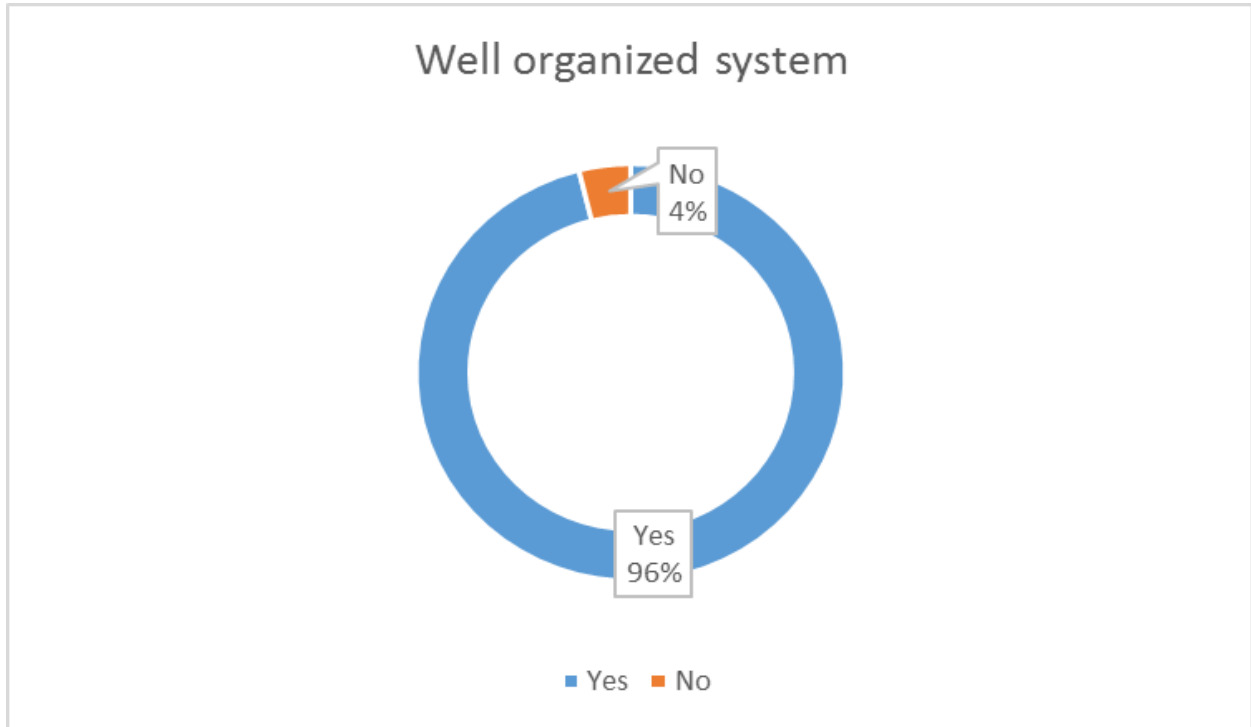
From the above pie chart we can identify that two hundred families responded that waste management will be a problem in the future and fifty seven said that it won't be a problem.

15. Do you think that the cost for waste collection is a burden for you?



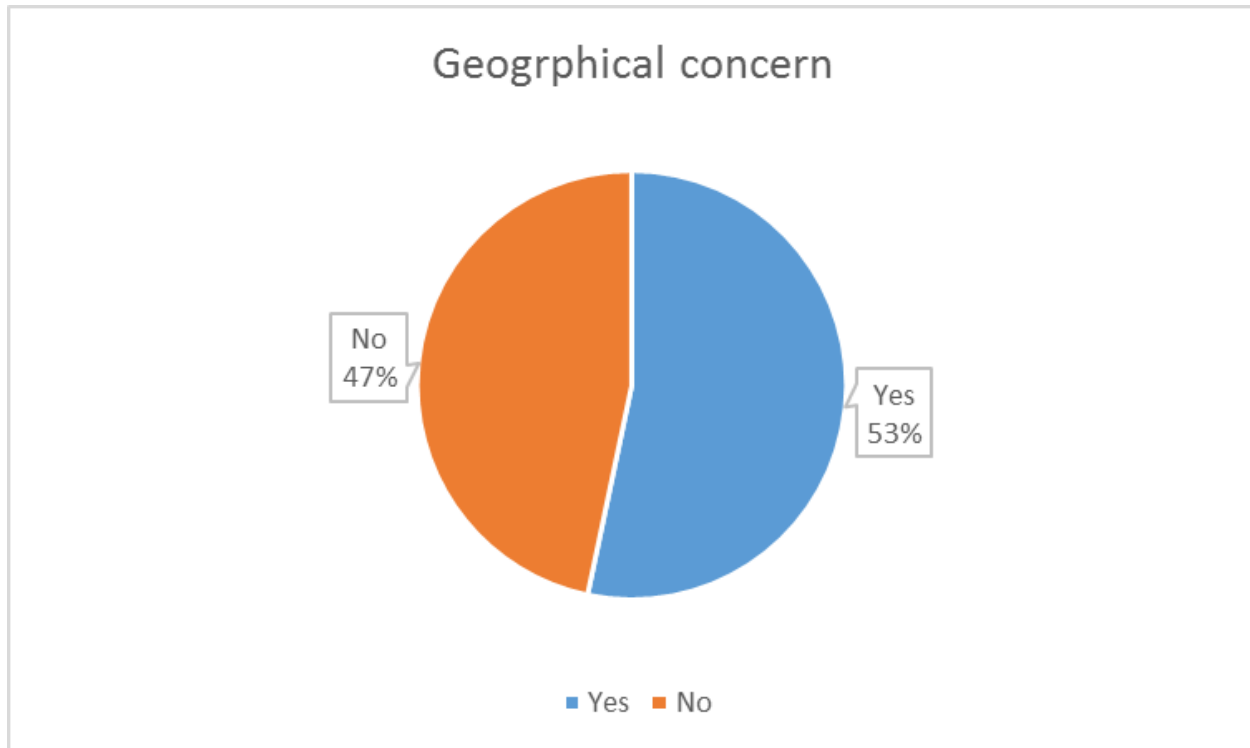
From the pie chart the researcher could identify that thirty three responded that waste collection was a problem and one twenty four said that it was not a problem.

16. Do you think that there is a need for a well-organized?  
Waste management system?



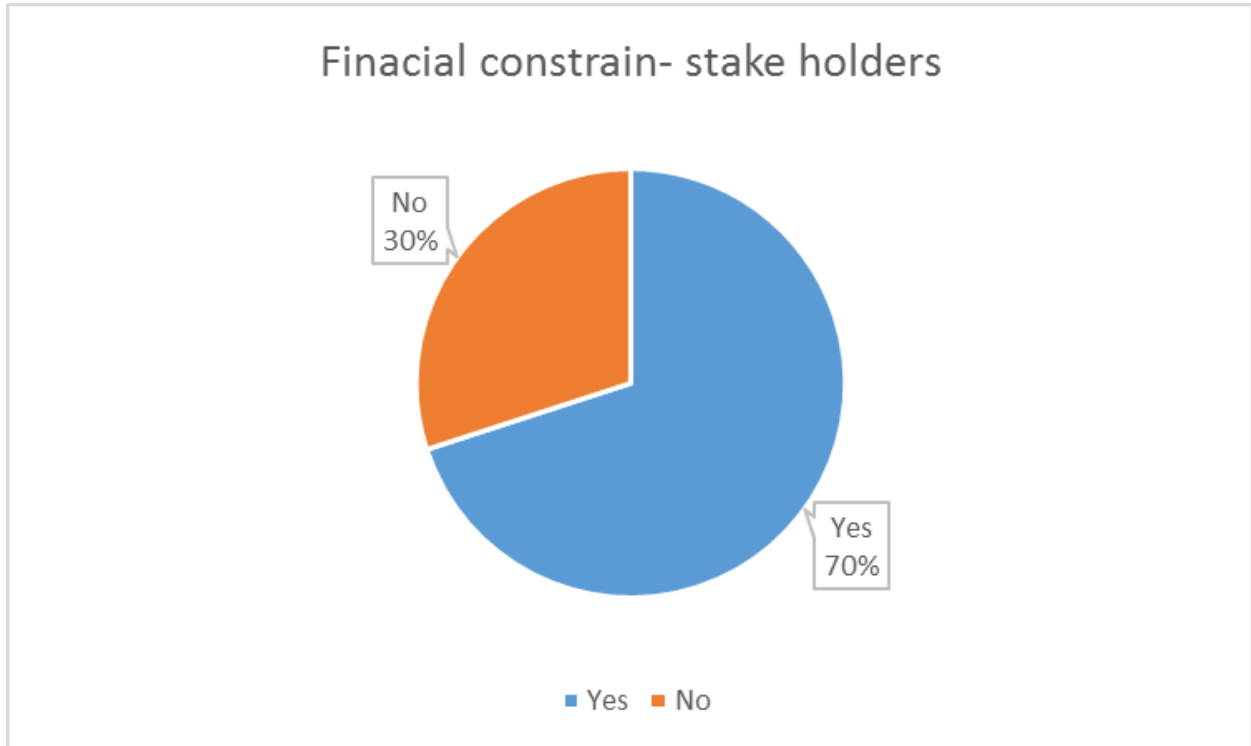
From the pie chart we can identify that two forty seven responded that waste management was well organized and ten responded that it was not well organized.

17. Do you think that geographical limitation is a problem for waste management?



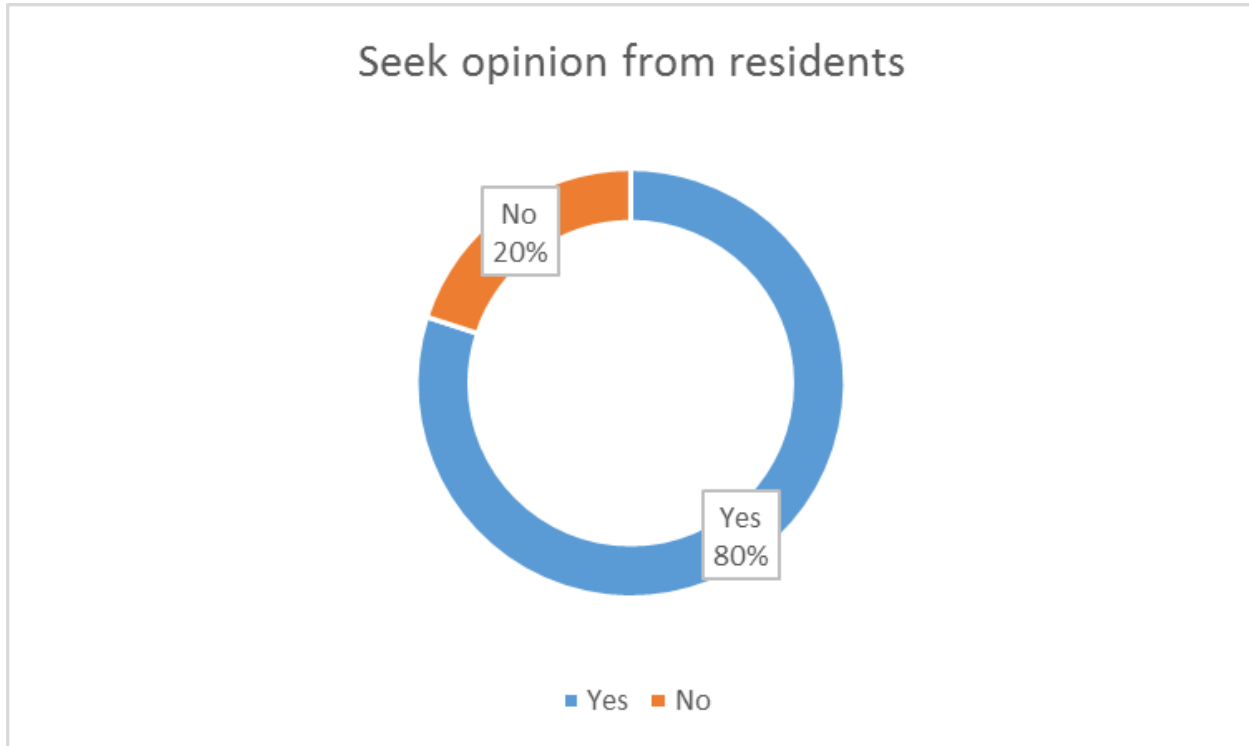
From the pie chart we can identify that one thirty seven said that geographical concern was a concern and one hundred twenty responded that geographical was not a concern.

18. Do you think that financial constraints are a problem for effective waste management?  
(Stakeholder analysis)



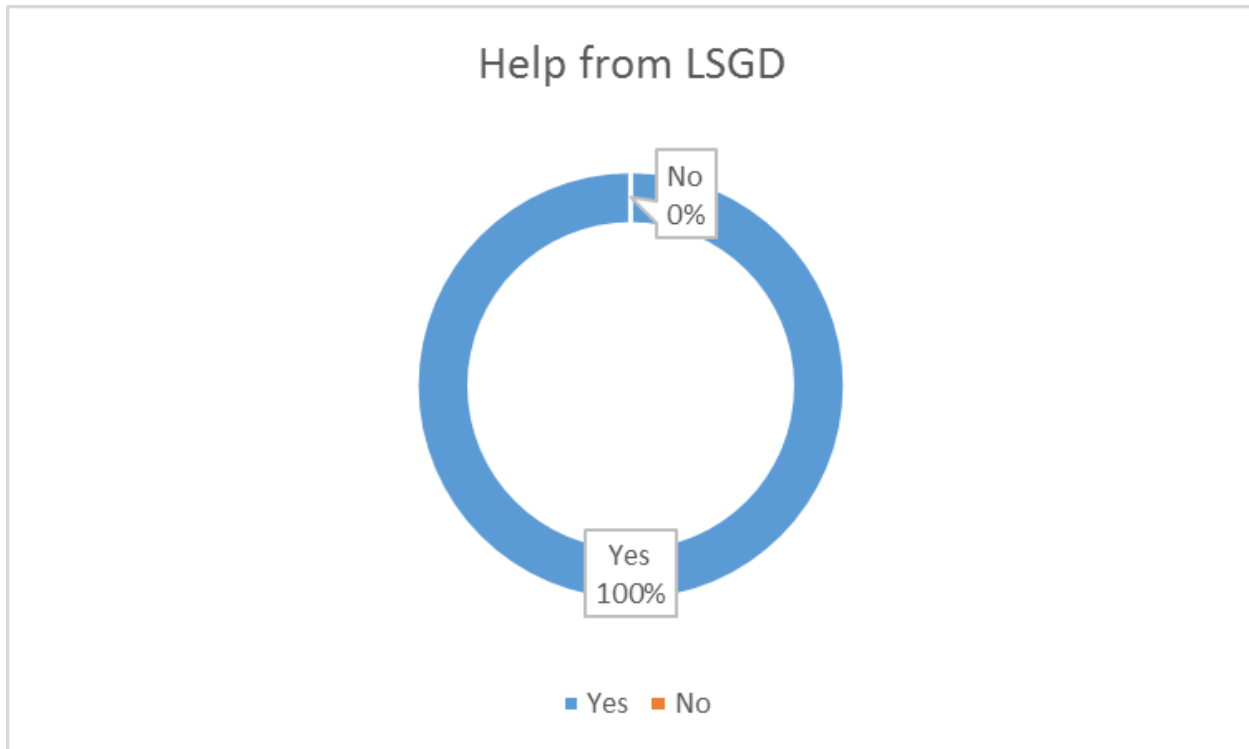
From the above pie chart the researcher could identify that seven stakeholders responded that financial concerns for waste management was an issue and three responded that it was not an issue.

19. Do you ask the opinion of the people residing in the area? (Stakeholders analysis)



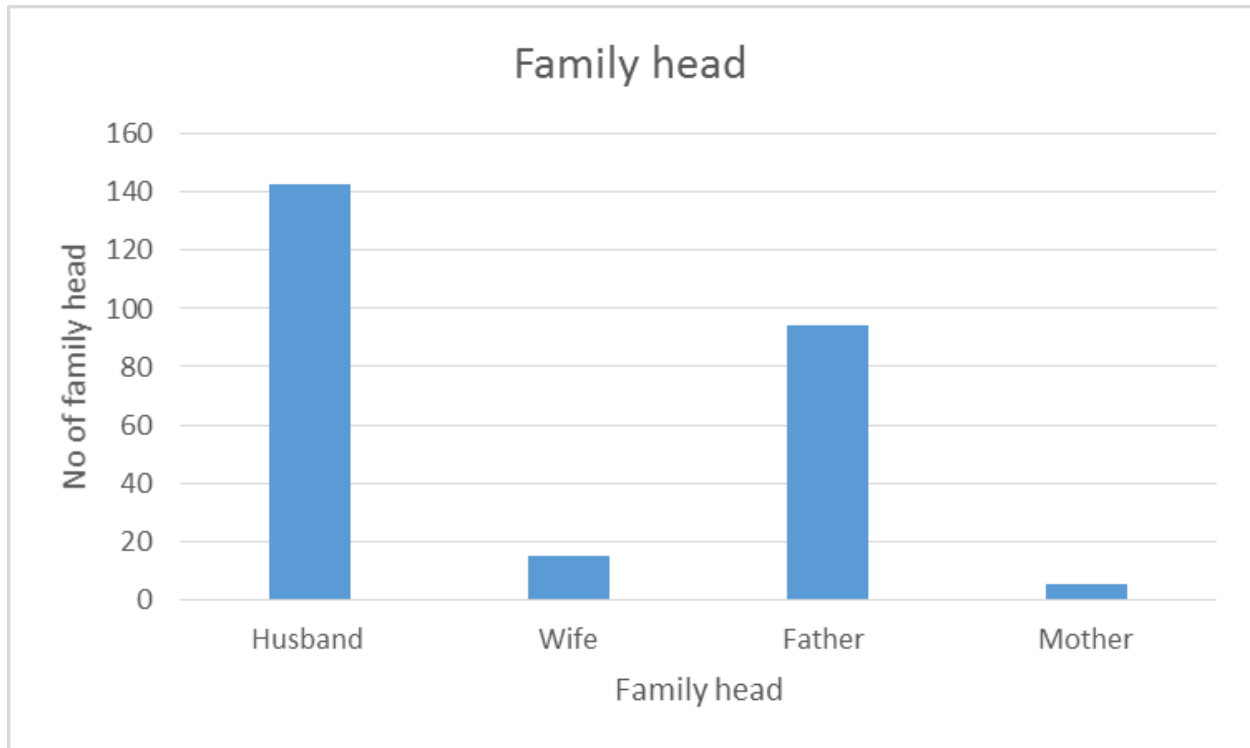
From the above pie chart the researcher could identify that eight of the stakeholders had seemed opinion from the residents of the area and two did not seek any suggestion from the residents.

20. Do you need any help from LSGD? (Stakeholders analysis)



From the pie chart the researcher could identify that every stakeholder had responded that they needed help from the local government for proper waste management.

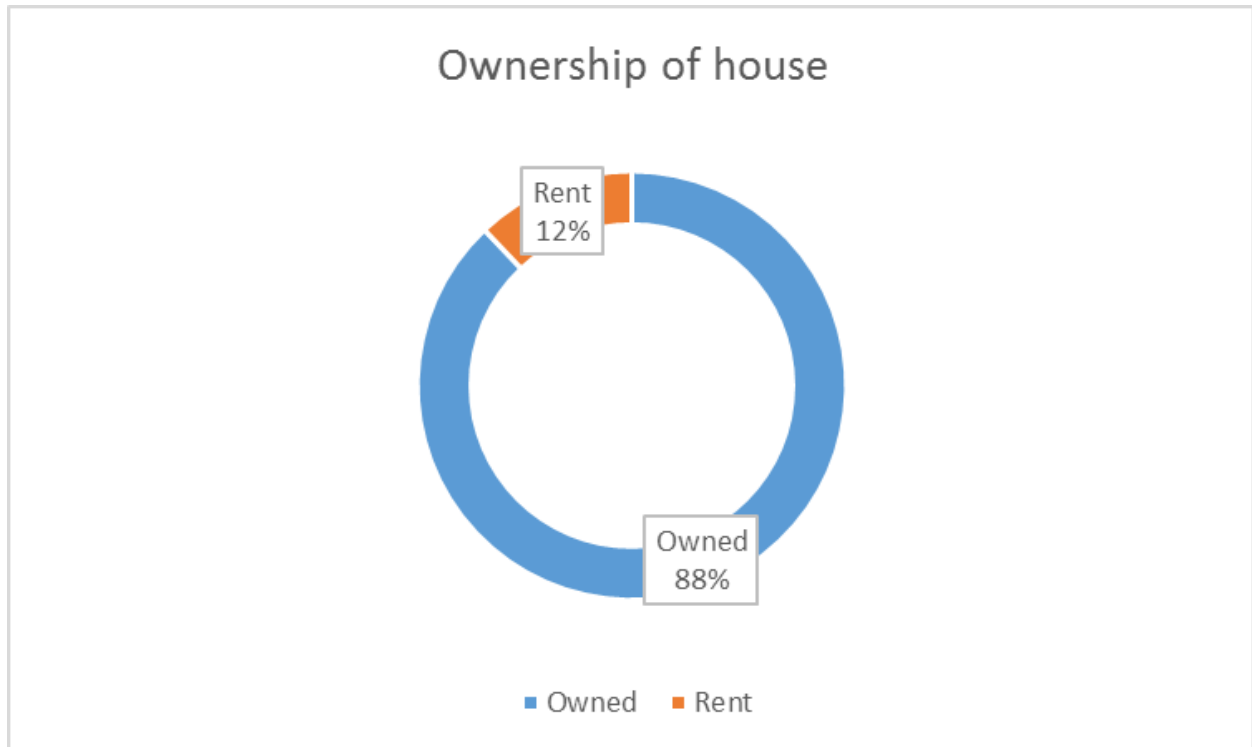
21. Family head composition



From the above bar graph we can observe that one forty three husband were the head of the family, the number of wives who were head of the family was fifteen, ninety four fathers and five mothers were the head of the family.

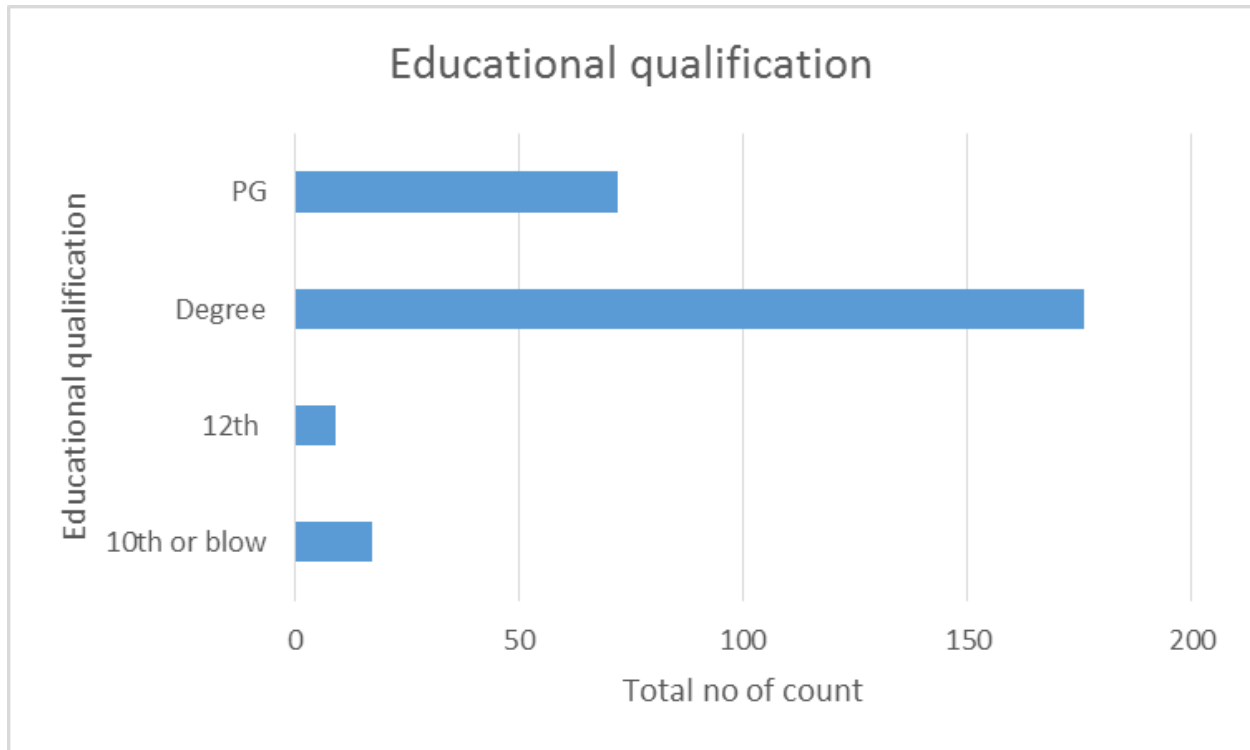


## 22. Ownership of house



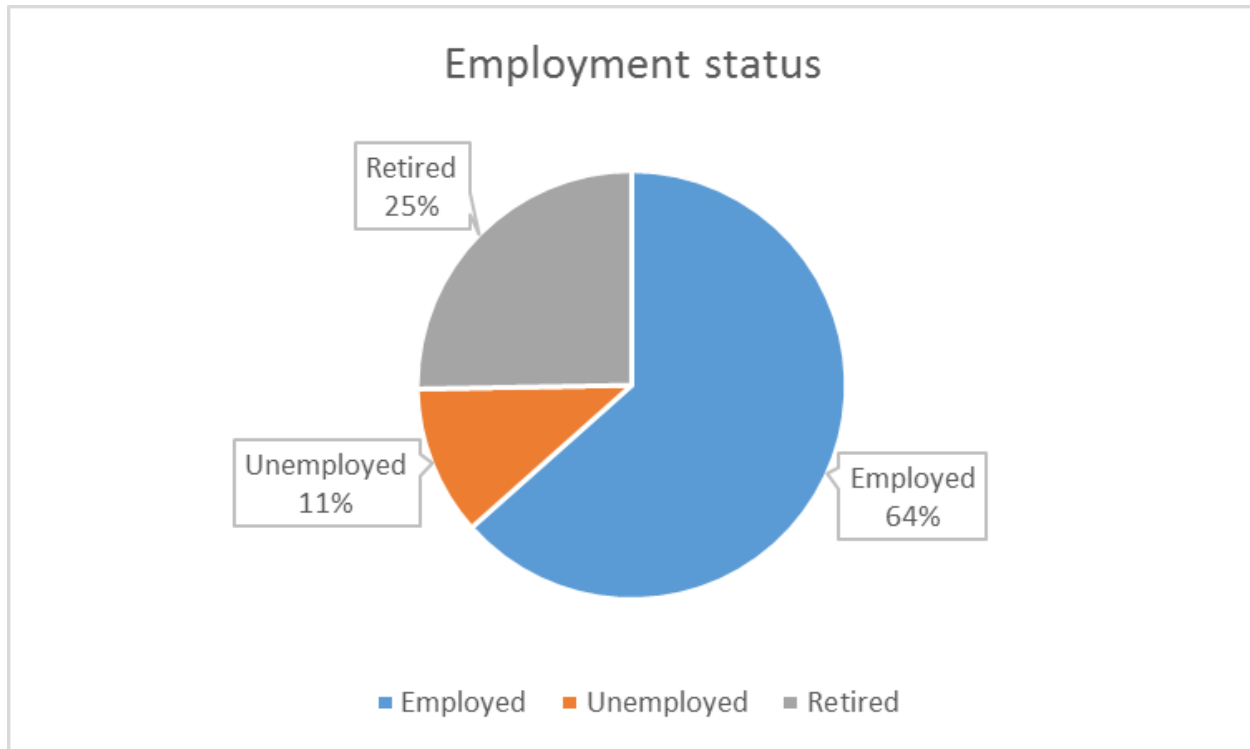
From the above pie chart we can understand two twenty six houses were owned and thirty one were rented out.

23. Educational qualification



From the above bar graph we can understand that above graph we can understand that seventeen of the respondent attend school till 10th, nine attended till class 12th, one hundred seventy six attended degree and seventy two till post-graduation.

24. Employment status



From the above pie chart we can understand that one sixty three respondents were employed, twenty nine were unemployed and sixty five were retired.

- To assess the socio demographic profile of the community :

The researcher had used a descriptive method of data collection to assess the socio demographic profile of the community. The researcher had included questions like location of the area they are staying, family head, educational qualification, type of house, income, total area of land etc. The researcher had included these questions to get the clear cut idea about the demography of the area and also to know about the status of the people living in the specific area. The researcher could identify that most of the families were headed by the husband and in some cases it was the wife because of divorce and demise of their partner. About 78% of the houses were owned and about 32% of the houses / apartments were rented out, in this the major share was contributed by apartments and flats. By knowing the income of the family, the researcher could identify that about 92% of the respondents were well settled and only 8% were not so economically well, but all the houses were pakka houses in the area. The people in the area had a good income as most of the respondents had an average of 36,500Rs per month. The employment status showed that most of the respondents living in the area were retired i.e. about 67% and others were involved in business and white collar jobs. The researcher had kept socio demography of the area as measured to know about the people's capacity for effective waste management. It is generally believed that people with good education and better economic conditions have a positive attitude toward waste management, as they know the importance of keeping their surroundings clean and healthy. They also will be interested in spending money for proper and effective waste management. But there was also some negative response from some residents even though they had good education and good economic conditions. From understanding the total area of the land the researcher was able to know whether waste management was possible in origins and also to know about the space availability of the total area to know whether any big plants and units would be able to set up in the area and also to see whether are any empty spots n to prevent these spots being turned into dumpsite. The employment of the residents of the area showed whether they will be able to spend money on adopting new and latest methods for waste management and also know whether they will be able to handle the fee that the private agency is going to impose on them for the collection of the waste. The socio- demographic profile of society is always considered as to know how well they are and also to know about how good their life is and what output they can give to the society.

- To understand and analyze the solid waste management practices of the community.

The researcher had used both descriptive and closed ended methods of data collection to understand the solid waste management. The researcher had asked descriptive questions like the amount of waste produced per month and most of the house had about 60 - 100 kg of waste, and out of this plastic and other non-biodegradable waste were more. The residents of the area had adopted many methods for disposal of waste and some of the methods were very eco-friendly and cost effective. The flats and apartments of the area had an incinerator and also a waste treatment plant, these were working during the initial time of installation but they gradually stopped there working and they stagnated for many years. But after the Brahmapuram issue many of the treatments plant were planned to be reopened by the concerned authorities of the association but as they were not working for a large period of time there were not working properly and when they were asked to restart the plant, they contacted the authorities who installed the plant, but they had to spend a large amount of money on it. In the cases of houses some of the houses had vegetable gardens because they had treatment plants like biogas, bio compost bins etc. The household had used the by-products as manure for their plants and vegetables. Most of the residents also followed the habit of proper disposal and segregation of waste. Even though the counselor had mentioned that there was no dumpsite in the area, but during the time of pilot study and observation done in the area could identify the dumpsite and the reason what the dumpsite still exist was because some of the residents of the area were not availing the service of haritha karma sena or they will not be segregating and disposing the waste responsibly. While asking about the segregation of waste, what most of the residence replied was that they had no proper buckets for separating the waste that is produced by them, and also they face many issues with waste items like old cloths, broken glass bottles etc and it was very hard for them to dispose of these kind of waste. Even though private agencies come to this area, they over charge for these items and because of this attitude of these agencies, most people decided that they won't be giving any waste to these agencies. Most of the people in the area used to burn the bio medical waste that is produced in their homes as they think these items are easy to dispose of by burning. One of the interesting feedback that was received by the that was received by some residence regarding the disposal of plastic waste was that, "as the haritha karma sena are not coming on time, or they do pick up the waste regularly, why should we pay them simply, so what we do is, as we are staying for rent in this locality we

take all the plastic waste to our home town and we dispose it of there”. By asking about the waste management practice the researcher got all this feedback from the respondents.

- To assess the perspectives, concerns and challenges of the community regarding solid waste management.

The researcher had used both descriptive and closed ended questions for collecting the data from to know about the perspective, concerns and challenges regarding waste management. The researcher has used questions like do the residents address their need to the authorities, problems faced during waste management, challenges. From the feedback given by the residents it was clear that majority of the residents didn't tell their concern to the authorities, because the feedback they had received from the authorities were not so satisfying. The main problem they had mentioned about waste collection was that the Haritha Karma Sena members were not so organized and the timing they had followed for waste collection was also not uniform and the next major challenge was that was addressed by many residents was that they had no bucket or proper bins for segregation and storage of waste and they last problem which was commonly mentioned was the Brahmapuram issue, because of which the entire waste management system was blocked. The resident had mentioned about the problems of waste item like diaper and also coconut shell, there was no proper way to dispose this type of waste and before the Brahmapuram issue the haritha karma sena members would come and pick the waste, but after the fire the collection of such items was hard. Even though coconut shell was not a problem the issue of diaper was a serious issue because they had to hand over this waste to private waste collectors, who charged a huge amount of money for the collection and the rate was calculated on kilo wise and after the diaper gets wet it would become heavy and for disposing this they had to give a huge amount. The main hindrance that they mentioned regarding the problem was proper disposal of waste because of the Brahmapuram issue and they could overcome these challenges by securely storing the waste materials till the collection was done, some gave the waste to private agencies and others disposed it in their homes and kept the plastic waste till it was collected. When the researcher had asked them about their perspective of proper waste management what the majority of them replied was the concept of waste management at origin and some suggested about waste management at community level, in between the researcher had also asked the respondents whether they have

taken any steps for the reduction of waste any model for waste management four residents and one entire flat had their own system of waste management like using bio compost bins, vermin compost and biogas plant, where some of them had developed their own homemade bio bins and some had dug a pit to compose there waste. Most of these houses also had vegetable gardens as the decomposed waste was good manure for their plant.in the case of waste reduction everyone replied that they are reducing the waste as much as possible. The suggestion for future waste management problems was not answered by most as they had no idea about what the future will be. The last question of the session was about whether the respondents were aware of solid waste management and its necessity, all of them replied that after the Brahmapuram issue this concept was much familiar and they said they feel like it is important. After this session of question the researcher was able to know about the perspective, concerns and challenges that are faced by the community and how do they handle the situation.

- To do a stakeholder analysis with respect to solid waste management.

The stakeholder's analysis was considered as one of the most important elements in the research as they are considered to be the people who are much aware of the condition of the area. The stakeholders who were focused were the ward counselor of the area, junior health inspector, local political leaders, ASHA workers and Haritha karma sena members. The main concern which was put forward by them was about the waste management issue and they stated that after the Brahmapuram issue the main challenge they had to face was the problem of collection and storing the waste, during the initial days the waste was collected and stored, but as days passed it was difficult for them to store the collected waste in the area. The next major issue they had to face was the issues created by the local rag pickers who went around the area and collected all kinds of waste from the area and deposited here and there which also created much problem as the area was very much littered. The people in the local area also started to throw away waste and also the researcher could identify that burning of plastic was also more in the area. The next challenge that the stakeholders had to face was the limitation of space and the majority of them agreed that they need more area where they can set up composting units or to set up waste collection points. The concern that the haritha karma sena members mentioned was that it was very difficult for them to transport the collected waste to the waste collection area. The reason for this was because the sena

members were using old tricycle for the collection of waste and it was very difficult for them to cover these 2000+ houses of the area, what they're doing is they take trips where they collect waste from one specific area, they take it to the storing point and then they gain go back to the area for collection. The problem that was put forward by the JHI AND HI was regarding the dumping of the waste in the surrounding area, because of the Brahmapuram issue the waste management system became inefficient which made the people to throw or dispose of waste in empty land and which turned into a landfill. As a method to prevent this the HI, JHI, local leaders with the permission of the counselor and the local government and then they deployed volunteers for night patrol at the areas where waste is dumped more. The researcher asked about whether they need both monetary support and local support from the government and all of the stakeholders replied that they need both the support and to be specific the counselor had asked monetary support for string and implementing new waste treatment plants and also asked the support of the planning commission for preparing a plan for the area. The counselor also added that the government need to provide subsidy on item like bio pots, bio gas, composting units. The haritha karma sena members had asked the support for providing with vehicles which they can use for waste collection and also it would have been a great help for them if they can be provide with E- vehicles which is more convenient and cost effective for them. Other stakeholders expect the haritha karma sena and HI, rest all used to seek or take suggestions from the residents of the area and if they find these plans to be feasible and yield a good result they used to implement those plans in the area. There were many personal suggestions that were put forward by the stakeholders, where they suggested the involvement of private agencies for waste collection and also providing waste disposal items like bio compost unit, bio compost pit to the residents of the area and to set up cameras and other monitoring systems in the area. The researcher after conducting the data collection could know about how serious the authorities are about waste management and how they had taken steps to solve this problem



**Chapter 5 – Findings,  
Recommendations,  
Implication for  
professional social  
work practice.**

### **Findings:**

After completing the research the researcher could find the following findings and those findings are:-

- The researcher could find that the people residing in the area as well the stakeholder of the specific area was very much satisfied with the waste management process of the area as the concerned authorities of the area are trying their best to find solution to this issue, address the need of the people as well as the problem of their service providers like Haritha Karma Sena and other subordinates. The counselor of the specific area has an alternative plan for solving the issue of waste if anything happens to the existing system. The counselor also found solutions to the problems that were put forward by the residents. Considering the waste management system all of the respondents were happy and satisfied with the process.
- The researcher could find that even though the counselor and the JHI found that there was no active dumpsite in the area, the researcher could see a few open dumpsites in an area which was vacant and these were not visible as there dumpsites are behind the compound walls. The researcher in between the data collection could see that some people were dumping their waste to these areas and slowly moving back and could find people using these dumpsites for burning their plastic waste.
- The researcher could find that most of the houses in the area was using bio compost pots and biogas in their homes and these were well functioning and the by product that is the manure that was obtained from this was used in their own vegetable garden that was set up them for the so that they can use the manure effectively and also the could cultivate vegetables which gave them both monetary and health benefits and they can save the money which they use for purchasing these items and also thy can gain good health by using their own produced vegetables by avoiding the ones with chemicals.
- The researcher could find that the flats and apartments in the area used either private agencies for waste collection or they had their own system of waste collection and those only availed the service of Haritha karma sena was those flats which don't have plastic disposing plant or those who didn't use the help of private agencies.
- The researcher could find that the counselor of the are we very much active and passionate in the promotion of waste management tools like bio compost bin, vermin compost, bio

gas etc. as she was actively asking the people in the area to use such alternatives and also sought the support of the LSGD for providing subsidy for those people who purchase these products and also even asked the researcher to give the residence of the area awareness about the importance and their benefits.

- The researcher could find that some of the residents had stored waste items like diapers and coconut shells in their homes for disposal, even though private agencies came, the cost for disposing of items like pampers was very high.
- The researcher could find that there was a water source in the area and the water in this was filled with African eared water moss or African payal because of which the water was stagnant and some people used to throw waste in these water bodies.
- The researcher could find that the people from other areas were coming and disposing waste in this area and the main contributor for this was the rag picker who came in tricycle and they dumped the waste in this area which they collected from some other area. There were also some other people who came from far away to dump waste in the specific area.
- The researcher could find out that the area which was selected for starting the MCF was an uneven area and it was very difficult for containers to be planted there, and even the haritha karma sena member had the same concern.
- The research could find majority of the residents in the area segregated waste and also they have availed the use of haritha karma sena for handling the both the waste and some residents had used the service of private agencies for the disposal of waste.
- The trainee could find that the number of houses in the area was high and also there were many apartments in the area and this was a well-populated residential area with a few shops and most of the residents were retired.
- The researcher could find that the people in the area were very much positive minded and also was very much well behaved with the researcher, but there was also some bitter experience which the researcher took as a challenge.

**Recommendations:**

The researcher after the survey could identify many things and could suggest many things some of the recommendations are:-

The researcher suggested to the stakeholder for planning a decentralized way of waste management where everything will be an organized system i.e. there should be a proper plan that should be made including all the stakeholders. The haritha karma sena should be given a proper area chart regarding the area's where they should cover and also about the number of houses each one should visit, they should also be given pepper uniform and protective gears that should be used by them when they go for waste collection and during rainy season, they should be given the items which prevent them from being wet. They should also be given proper vehicles in which waste collection will be easy and they can collect a good decent amount of waste. The area where the waste collection is to be done and where the MCF container will be installed, this area should be leveled and then the container should be planned and also the area should be cleared well and should be beautified so that the public does not litter the area again.

The researcher also suggested to do a full survey of the area and to apply QR codes in the entire Cochin corporation so that the authorities will be aware and also will get data about who all will be giving the waste and who are not and also will be able to know the efficiency of the Haritha karma sena's work and also can get the data base on how much fee the residents are paying and also about the collection pattern.

The next suggestion that was put forward by the researcher was to provide more awareness and education to the people about the need for waste management and also the best ways by which the waste can be disposed of at origin and also the residents should be provided with bio bins which should be colored so it is easy for them to segregate and keep their waste, without being spoiled by rain or other animals.

The researcher suggested keeping CCTV surveillance in areas where dumping is still continuing and also asked to form a squad to monitor these areas. The squad, the residents, and the local leader should also keep an eye on the rag pickers who come from other areas to dispose of their waste.

The researcher also suggested to include more youth and students to these areas for the monitoring of the waste management system, they can also ask the youth to provide awareness through IEC activities like wall painting, beautification, clean drives, and also they can involve the local people so that they also know the importance.

**Implication for professional social work practice:**

The researcher had kept the following implication while carrying out the research and the implication that were used are the following:-

- Ethical practice and professionalism: the researcher throughout his research could keep the code of conduct that should be followed by him, which include respecting the respondent, showing dignity and respect to them while interacting with them.
- Evaluation: the researcher had done an evaluation about the community to identify the problems that exist there and this was done by conducting FGD, survey and observation, and the information obtained from this was used for making plans and action.
- Development of plans and policies: the researcher from the data he had obtained created plan action that can be used for the effective waste management in the area. These plans were used for the betterment and development of the area.
- Educator: the researcher had educated the residents of the area on how to properly manage their waste and also on the importance of segregation of waste.
- Community development: the researcher had used the data to create a plan which helps in the development of the area.
- Informed consent: the researcher had seeked consent from the respondent before the beginning of the survey and also stated that they were not forced to participate in the survey.
- Confidentiality: the researcher had maintained complete privacy for the respondent and didn't ask the name or contact detail of the respondent.
- Respect: the researcher had given complete respect to the respondent and didn't force them or compel them to be part of the survey.
- Reporting: the researcher had reported all the received data and made sure that no data is being manipulated or they are not being handed over to any others.

## **Conclusion**

The researcher after conducting the survey was able to understand what all were the challenges and problems that exist in the proper management and disposal of waste. The researcher could also get a clear cut idea about the area where the research was carried out and also could get the attitude of people towards waste management. The overall result of the research was a positive response and most of the people had the same opinion and all of them were satisfied with the waste management process of the area. The researcher could also suggest new ideas and ways for effective waste management and also could create an action plan for the problem of the waste management system of the area.

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## Appendix

I am Abel Joseph Martin, second year MSW student of Bharata Mata College Thrikkakara. As part of my academic research, I am preparing a research paper on the topic “A STUDY ON SOLID WASTE MANAGEMENT IN COCHIN CORPORATION” and as part of this I will need your valuable response, which would add support to my research. I assure you that your participation will remain anonymous and confidential. The data collected will be used only for academic purposes. Kindly grant permission for data collection. I understand that your time is precious, and sincerely appreciate your participation and cooperation.

Thank you for spending your valuable time!

### **To assess the socio demographic profile of the community.**

1. Name of the respondent
2. Location of residence
3. Type of building -
4. Name of residential association / apartment / villa name / commercial space
5. Family head
6. Family composition
7. Rented or owned house
8. Educational qualification
9. Type of house paka/kacah
10. Employment status
11. Household income
12. Total area of land

### **To understand and analyze the solid waste management practices of the community.**

1. Average amount of waste produced every month
2. Do you segregate waste (Yes/No?)
3. Do you use the service of Haritha Karma Sena (Yes/No?)
4. How are you handling your Bio degradable waste?
  - In house

- Haritha karma sena
- Community level composting unit
- Pig farm
- Collected by others / others

5. How are you handling Non-Biodegradable waste?

- Burning
- Littering
- Haritha karma sena
- Private agencies
- Others

6. How are you handling biomedical waste?

**To assess the perspectives, concerns and challenges of the community regarding solid waste management.**

1. Do you think that waste management is the problem in your locality?

2. If yes. Do you address authority?

3. After addressing the issues, what was their response?

4. What are the problems you face while managing your waste?

5. Do these problems create any challenges or hindrances for waste management?

6. Are you able to overcome these challenges?

7. What is your perspective on proper waste management?

8. Have you taken an initiative by yourself for waste reduction?

9. Have you introduced any method in your home as a model to others?

10. Do you have any concern for the future waste management system?

11. Do you think that waste management will be a problem in the future?

12. If so, do you have any suggestions?

13. Do you think that the cost for waste collection is a burden for you?

14. Do you think that there is a need for a well-organized waste management system?

15. Do you think that geographical limitation is a problem for waste management?

16. Are you aware about the concept of solid waste management and do you think it is a necessity?

**To do a stakeholder analysis with respect to solid waste management.**

1. What was the existing waste management method?
2. What were the difficulties faced after the Brahmapuram issue?
3. What is the new waste management adopted in the area?
4. Do you think that financial constraints are a problem for effective waste management?
5. Do you ask the opinion of the people residing in the area?
6. Do you need any help from LSGD?
7. Personal suggestion for effective waste management.