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TRANSFORMING MANGALURU INTO 'THE E-CLEAN SMART CITY'

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Abstract:E Waste is another addition to the ever-growing hazards of dumped waste in India. Developing countries are already facing the major threats due to E waste and it has caught every countries concern. In India though we do not hear about E Waste as a major problem; we find a huge E waste disposed in the major cities. This is due to production and usage of electrical and electronic equipment. This paper is about electronic waste management in Mangalore city which is recently declared as' smart city'. It analyses about people awareness on E waste and studies the pattern of E waste disposal and the role played by MCC.
Key word - Role of MCC (Mangaluru City Corporation) in E Waste Management.

I. INTRODUCTION

India has not yet succeeded in managing the solid waste and the liquid waste (i.e. the domestic and the industrial drain water) properly. But it has already come across the most dangerous threat by the disposal of E waste. Almost 2.7 million tons of electronic waste is being generated annually in India according to the recent studies.This is alarge quantity of waste for a country like India. The studies also mention that India is the fifth largest E waste producer in the world. Central Pollution Control Board (CPCB) estimated India's e-waste at 1.47 lakh tonnes or 0.573 MT per day.

The absence of specific legislation is one of the biggest stumbling blocks in India. As a result, India may become a more popular spot for the e-waste trade in the future. Mobile phone batteries are disposed in large numbers as the huge Indian population uses mobile phones. The disposal leads to a major threat to the nation. They wear out faster than the phone, giving cellular telephone companies more business opportunities. Likewise Domestic E waste s also contributing a lot to the E waste. Despite Municipals' Solid Waste Management and arrangements the waste is disposed in an unscientific manner, with crude open dumping. The threat is mainly to the cities compared to the villages.

The term E- Waste:

The wasteor unusable electronic equipment/products such as batteries, record players, radios, VCRs and black-and-white TVs., CD and DVD players wrist watches/wall clocks, credit cards/smart cards, refrigerators, telephone boards ,computer monitors, CRT, keyboards, laptops, modems, connecting wires and cables fax machines, printers, cartridges, hard drives, floppy drives, Compact disks, CPUs, memory chips etc., are called as E waste.

Causes of E Waste in large quantity:

Materialism has become the current social trend in India.The industrial revolution along with the advancement in technology; the lifestylechanges or the rise in standard of living, maintaining the status, the end of the gadgets useful life or dead equipment which are discarded, contribute to the rise in E waste.

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The innovation in science and technology has made an incredible change in the electronic industry show casing an assorted range of new products every day to the world. India has been impacted by this digital revolution, also there is a callby the Indian prime minister to Digitize India. The youth of India are highly attracted to the newer electronic devices. The young population of India makes the major portion of the consumer of electronic gadgets and discard them soon after. In India consumption rate of electronic goods grows at a rapid rate producing a large amount of waste electrical and electronic equipment.

In the developed countries processing or recycling the e-waste is too expensive, and there is lack of space for dump yard among the developing countries.

Consequences of E- waste:

Every country is fighting against global warming, solid waste disposal and drain water management. Few of the countries have succeeded in managing the solid waste and the drain. Netherlands has the best waste management system in the whole world. In India we had waste materials like clothes, plastics and other domestic items along with industrial waste. Yes now E waste makes part of the solid waste. But it has led to a major threat to the developed countries and is raising an alarming threat to the developing countries.

Metals such as lead, mercury, cadmium and arsenic are all present in e-waste. For those Indian workers who spend endless days exposed to dangerous levels of toxic elements with little to no protection while breaking electronics down by hand, the risks are clear.

II RESEARCH METHODOLOGY

A. *Objectives of the study:*

- ✓ To study the awareness among Mangaluruyoung citizens about E Waste and its hazards
- ✓ To study Mangaluru corporation's (MCC) preparedness to fight with this problem
- ✓ To analyse the possible solution for the problem

B. *Scope of the study, Sampling& data collection*:

This study is limited to Mangaluru city limit only. The sample size is 100 youth aged between 20yrs -35yrs. Sample for the study was chosen randomly and were personally interviewed. The commissioner as well as the environment engineer and the employees of health department of Mangaluru City Corporation were also interviewed.

III ANALYSIS OF THE STUDY

The data was collected through personal interview. The collected data further analysed with the simple statistical technique which is presented in the form of tables below:

Table No. 1 Awareness on E waste

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	*Yes*	4	4.0	4.0	4.0
	No	96	95.0	96.0	100.0
	Total	100	99.0	100.0	
Missing	System	1	1.0		
Total		101	100.0		

The above table shows that only 4 respondents out of hundred accepted that they are aware about the term E- waste. This does not mean that the others (96 respondents) are completely ignorant about E-Waste. When the researcher explained the Electronic waste they understood the term 'E-waste'. This is mainly due to it is a new concept, there is less awareness spread about its (E-waste) hazards. It is neither the talk of the town nor part of the common language. Through this study we can analyse that awareness on E waste need to be created.

Table No. 2 Awareness about E waste bin in Mangalore

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	*yes*	2	2.0	2.0	2.0
	no	98	97.0	98.0	100.0
	Total	100	99.0	100.0	
Missing	System	1	1.0		
Total		101	100.0		

Table No. 2 shows Awareness about E waste collection Bin (arrangements done by MangaluruCity Corporation). In this study we find that only 2 respondents were aware about this arrangement of MCC. Rest 98 respondents were totally ignorant about the same. But there was an attempt made by the researcher to inform/educate them about the arrangement. The reason for this ignorance is the samples for the study were youth, who lead a happy, comfortable life. Various studies have proved how quickly the youth get attracted to the negative activities/ news. But the positive activities do not attract them as it is not in their area of interest. Hence we can analyse that the news of E waste bin did not attract the youth.

Table No. 3 Disposal of E Waste

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	scrap	18	17.8	18.0	18.0
	garbage	82	81.2	82.0	100.0
	Total	100	99.0	100.0	
Missing	System	1	1.0		
Total		101	100.0		

Above Table no. 3 shows the E waste disposal pattern of the respondents. 82 respondents out of 100 disposed the E waste along with domestic garbage. The reason is ignorance of its hazards and the quantity of E waste was too small for example – CD's connecting wires, batteries cell phones etc.

The other 18 respondents sold the E waste to the scrap dealers.As the majority were ignorant about the e waste bin, the question on E bin usage was not made use in this study. Through this study we can analyse that 18 respondents made atleast a proper disposal through selling it to the scrap dealers who supply their scrap to the recyclers.

Table No. 4 Awareness on Hazards of E waste

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	1.0	1.0	1.0
	yes	16	15.8	15.8	16.8
	some idea	73	72.3	72.3	89.1
	no idea	11	10.9	10.9	100.0
	Total	101	100.0	100.0	

Table no. 4 above shows the public awareness on hazards of E waste.16 out of 100 respondents are thoroughly aware about the hazards of E waste. Whereas11 respondents do not have any idea about hazards/consequences of E waste. 73 out of 100 respondents have a vague idea about E waste hazards, i.e.they believe that all the waste that we dispose causes minor or major problems. The awareness on Global warming could succeed in catching the attention of the general public. The above study shows that there is a great need felt for the creation of public awareness on E waste hazards.

Those who are aware about the E- waste hazards mentioned them as below:

Soil pollution, radiation, global warming, if it is near the water source it pollutes the water too, burning the batteries/other exponents cause explosions. If not it causes air pollution as there is too high carbon monoxide release, which ultimately leads to diseases. It is a point of appreciation that atleastsome of the youth are aware about the E Waste hazards.

Table No. 5 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
awareness on E waste	100	1.00	2.00	1.9600	.19695
awareness on E bin in Mangaluru	100	1.00	2.00	1.9800	.14071
how do they dispose the E Waste	100	1.00	2.00	1.8200	.38612
Valid N (listwise)	100				

The above table is a combined descriptive analysis of the above 4 tables On 95% of occasions the mean of all the three variables is likely to fall within the range of the mean plus or minus 2. The variable 'awareness of E waste' is 1.96 i.e. its mean value is 2 which means the lack awareness of E waste concept among the youth. The mean value of awareness of E Waste bin in Mangaluru is again 1.98 which tells us that majority of the respondents are/were ignorant about the arrangement made by MCC. The mean value of how the E waste is disposed by the

respondents is 1.82 which again comes in the range of 2 i.e. most of the respondents dispose their E waste through the scrap dealers.

A. Efforts of MCC in E Waste Management

The researcher collected the following details from the MCC members through personal interaction. In Mangaluru the e waste found is - batteries, monitors, mother boards, cartridges, printers. Majorly cartridges were found in area covered from Infosys to Emphasis. One of the reason for the large no of disposed cartridges could be many offices and business sectors have set up in this area and all of them make use of printers.

Very recently Mangaluru is declared as the smart city and there is lot of effort made by MCC to maintain it. MCC probably could be the first city in Karnataka state to introduce this project. E waste bins are placed in MCC complex at Mangaluru and at Surathkal the sub urban corporation also there is a plan to place an E waste bin at the City Centre Mall where a large number of population found moving in and out. The health department also made a statement saying that the E waste is found Mangalore is low in quantity. They too opined that many of the people sell it off to the scrap dealer which is a cause of concern to them as they are unaware about the scrap after sales. And few of the Household e waste is disposed along with garbage.

Members of MCC also opine that there is lack of public awareness on MCC 'E- waste bin' and that they haven't found much of E waste from general public. This information supports the findings of table no.1.

MCC has collaborated with MMR - Moogambigai Metal Refineries who have newly set up a recycling plant in BaikampadyMangaluru.The industrial E waste directly collected by MMR Company on call; as it is large in quantity. It is a factor of appreciation for the corporation as it goes to the right company who segregate and reproduce plastic granules, metals like aluminium, copper etc.

B. Future plans of MCC

MCC is planning to distribute handbills in order to create awareness and to Increase E waste collection centres once they notice proper E waste disposal by the general public.

C. Suggestions

E waste contains valuable and recoverable materials such as aluminium, copper, gold, silver, plastics and ferrous metals. E waste is rapidly growing segment of the solid waste. In order to protect and preserve our natural resources and to avoid the negative consequences of E Waste, hazardous waste can be refined, reused, and recycled instead of being dumped in open yards. Through Recycling we can produce valuable new products, as a result of recycling we save energy, reduce pollution, reduce greenhouse gas emissions, and save resources by extracting fewer raw materials from the earth. This practice can protect our surroundings and conserve the natural resources.

Valuable metal like Gold can be recovered from the computer scrapsi.e. 1 gram of pure gold can be recovered from the 500 gram of timed circuit card fingers. Though it is a hard and lengthier process, it can generate employments to the poor and unskilledcitizens. With the proper training, precaution and awareness these employees can also be protected.

IV CONCLUSION

As environment protection is neglected by the general public and the government is forced to take up the responsibility. Similarly in Mangaluru, MCC has taken good initiatives in solid waste and E waste management. It can motivate scrap collectors with good incentives. The

informal recyclers can be trained to handle the process properly and effectively. Local - small scale industry can be encouraged which makes the larger or major industry's work easier. It will help in better environmental protection and also good economic and social benefits. This way the hazards or diseases caused by E –waste scrap handling can be controlled.

According to the members of MCC, in Mangaluru we haven't faced any major issues related to E waste health hazards, but the various research studies warn us to be prepared for the future. The E waste rate is increasing; it is an alarming sign for us to be prepared in advance. New businessmen and businesses can emerge through recycling the E-Waste. New businesses give opportunity to new employments and can contribute to the Revenue/income generation along with protection of our environment. Major recyclers can produce gold through recycling the E-waste which can further contribute a little to the national saving.

We need to capture the young minds in order to create awareness through educating the youth and children who are creative and innovative so that they turn to be the E- experts in future and transform the E waste into valuable resources. The attempt of E experts and the MCCcan surely transform our city into "The E-clean Smart City".

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