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AWARENESS OF RECYCLERS ABOUT E-WASTE- A SURVEY CONDUCTED IN NORTHERN STATES OF INDIA

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ABSTRACT

At initial stage of electronic products development it was assumed that electronic industry is very neat and clean industry as it does not produce any harmful residuals upon disposal. But this assumption proved wrong as electronic products contain lead, mercury, chromium, beryllium and other harmful materials which cause kidney failure, cancer and serious damage to lungs etc. That's why it becomes very necessary to think for the management of e-waste. These days most of the electronic waste is managed by informal channel in India. Formal collection channel is totally absent in India. Scrap dealer collect the electronic waste from the house, organizations etc. Scrap dealers itself manage the e-waste or sold it to someone else. As it contains hazardous materials, attention must be paid for proper disposal of electronic waste. Because India has second highest population in the world, sales of electronics items like mobile phones, PC/laptops and other electronic items is quite higher as compared the other countries. Other side of this factor is that sale of electronic products is directly proportional to the generation of e-waste as after end of life (EOL) and technological advancement of the e-product, the old product was discarded. E-waste is the term used for all the electronic products which are discarded or not fit for use. Unauthorised recycling of e-waste become more dangerous as it harms the environment and health of the individual too. Components in working condition also segregated from e-waste, which also support the e-waste management programme. Another problem is that, India is one of largest importer of the e-waste. Various developed countries dump their e-waste in India. The main reasons behind this dumping are lack of proper implementation of rules and regulations of e-waste management, availability of labour at cheaper price, unemployment etc. In this paper a survey was conducted to find out the awareness of the recyclers about e-waste. Northern Indian states were selected for the survey.

KEYWORDS: Electronic Waste, End Of Life (EOL), Northern Indian States, Awareness, Electronic Products

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1.INTRODUCTION

Today we are travelling with very serious health hazards products as we have mobiles in our pockets, laptops in our bags and any other gadgets with us. These causes very serious health hazards to any human being and the environment also. We Indian have a habit to store our old electronic product at home this is due to the low awareness about the hazardous effect of e-waste on environment and health of the individual. Electronic industry is one of the fastest growing industries in India. So many foreign companies are coming in India to set up their plant. E-waste is the term used for discarded electronic devices which are not fit for their original use. Electronic industry is very vast industry producing a large variety of products. Today life span of the electronic devices becomes very less due to technological advancement, cheaper price and availability of more functions in new product. This ultimately leads to the development of e-waste. Today electronic devices become our basic need. Everybody wants latest technological gadgets in their hands. Recyclers as a stakeholder play very important role in e-waste management. This is the only pillar which is responsible for the formal disposal of e-waste. Formal E-waste management is very important not only for that it contains hazardous materials but also for the recovery of precious metals like gold, silver etc. It is also necessary for the recovery of working components from the discarded electronic equipments. Land filling and open burning of discarded electronic products cause very serious effect on environment and health of the individual. In India most of the e-waste is managed by informal channel due to absence of the formal collection channel. The informal channel has no idea about the hazardous effect of e-waste on human health. This paper is just to check the level of awareness of the recyclers about e-waste.

Research Paper

2. LITERATURE

Recycling is a very lucrative business in India and dominated with informal actors (Manomaivibool, 2009) [6]. The "E-waste" recycling sector in many parts of Asia remains largely unregulated (Greenpeace, 2005) and India is no exception to it [4]. This is due to values in some types of used products, mainly metal-based products and those with PWBs, and low labour costs (Manomaivibool, 2009) [6]. Moreover, the sector is poorly studied with regard to its impacts on the environment and on the health of recycling workers and surrounding communities. In the context of India, the E-waste recycling sector could be divided into Non formal or Informal and Formal sectors Borthakur and Sinha (2013) [1].

According to Das (2014) E-Waste Recyclers Association was formed in July 2009, to address Problems faced by the organised sector - Lack of proper collection and disposal mechanism - Stiff resistance from large informal sector - TIC Group India Pvt. Ltd. in Noida (UP) has capacity 500 tonnes of E-Waste annually but processing only 200 tonnes per year - Attero recycling unit in Roorkee (Uttarakhand) is a 35 crore plant can process 36000 tonnes per year although getting 600 tonnes currently - License to import may be necessary to sustain formal business - Collection system to improve. E-Parisara in the formal sector in Bengaluru has been encouraged by the Central and State Pollution Control Board which would like it replicated in all major cities in the country IBM, Tate Elxsi, ABB and Philips are among its clients. But many major IT firms are not responding Capacity - 3 tonnes / day Utilising - 1 tonne / day [3].

More than 90% of the E-Waste generated in the country end up in the unorganised market for recycling and disposal - The unorganised sector mainly consists of the urban slums of the metros and mini metros where recycling operations are carried out by the unskilled employees using the most rudimentary methods to reduce cost. - Workers face dangerous working conditions as they may be without protection like gloves or masks. Very often child labour is employed to separate the parts from the circuit board utilising wire cutters pliers - Nitric acid is used on the circuit board to remove gold and platinum - It is estimated that about half of the circuit boards used in the appliances in India end up in Moradabad (Uttar Pradesh) also called Peetal Nagri or the brass city - Private and Public Sector prefer auctioning their E-Waste to informal dismantlers and get good price of it - Strict regulation is necessary to process E-Waste through organised sector Das (2014) [3].

The informal sector has a historic role in waste management and recycling in India and it is well known that e-waste recycling is no exception to this with an estimated 95 percent of e-waste being recycled through the informal sector (MAIT-GTZ, 2007) [5]

According to Borthakur and Sinha (2013) [1] there are well-established networks of waste collectors/dealers, dismantlers, and recyclers in India, most of which belong to the informal sector. Each such unit operates in a small scale, as for example in the form of door-to-door waste collectors/dealers, known locally as "kawariwalas"(Manomaivibool, 2009)[6] Non-formal units generally follow the steps such as collection of the E-waste from the rag pickers, disassembly of the products for their useable parts, components, modules, which are having resell value. The rest of the material is chemically treated to recover precious metals causing leaching of hazardous substances to the air, soil, and water. Such recycling method has low efficiency and recovery is carried out only for valuable metals like gold, silver, aluminium, copper, etc and other materials such as tantalum, cadmium, zinc, palladium etc. could not be recovered. Kawaries and small scrap dealers are mainly responsible for door-to-door collection activities. They usually collect the E-waste from consumer with suitable compensatory price. Kawaries are one of the most efficient collectors of E-waste and also reduce the load of civil agencies responsible for waste collection (Chatterjee & Kumar, 2009) [2].

2.1 Problem Formulation:

As it become very essential to check the awareness level of each pillars which either contribute in generation or management of the recycler. This is due to various hazards associated with electronic products. So awareness level of the recyclers about the hazardous effect of the electronic waste was checked needs to be examined. This is necessary to check their awareness/ knowledge of hazardous effect of e-waste as they are directly associated with the management of e-waste.

2.2 Objective of Study:

Objective of the study is to check the level of awareness of recyclers about the hazardous effects of the e-waste on human health.

2.3 Research Methodology:

States from northern India was selected to check the level of awareness of the recyclers. A questionnaire on likert scale was prepared. Questionnaire contains eight questions. The survey was conducted between the recyclers of northern Indian states. The survey was conducted with personal interaction with the recyclers.

3. RESULT & DISCUSSION

On the behalf of the survey conducted we can say that:

In response to the very first question which is about the knowledge of stakeholders about electronic devices contain toxic/hazardous materials, approx 6 % of the stakeholders have no idea that e-waste contains hazardous materials which is very harmful for human health. They are totally unaware of e-waste hazardous effects. Same percentages (6 %) of the stakeholders have very little knowledge of the hazardous materials. 62 % of the total stakeholders set their knowledge level as moderate which is not up to the satisfaction level as e-waste recyclers are directly dealing with the e-waste. Also they are more close to the dangerous materials. These materials have very adverse effects on anybody's health. So it becomes essential that the workers dealing with the e-waste should have sound knowledge of the hazardous effects of e-waste on human health and environment as well. Only 24 % of the stakeholders have high knowledge of the hazardous materials. On the other hand approx 3 % of the stakeholders population find their knowledge

as highly updated knowledge about recycling. This is very less, so government should run some awareness programme so that consumers as well as recyclers get aware of e-waste negative impact. Government should make some serious efforts to increase the awareness level of the end user and the recyclers. It also becomes necessary as these days everybody is travelling with such types of hazardous devices in the form of mobile phones, laptops and other electronics devices. We have a number of electronics devices at our home also, some of which are in working condition other are not in working condition, but we store them.

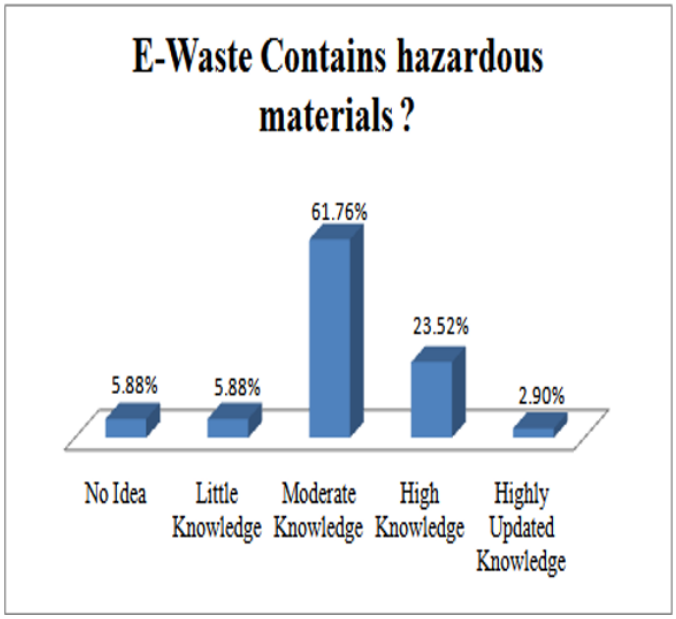

Figure 1: Components of electronic device contains hazardous materials

Next question is to check the knowledge of recyclers that residual left after recycling needs special treatment before disposed off. We have very shocking result in response of this question. Approx 30 % of the total have no idea that residual left after recycling process needs special treatment before its disposal. 47 % of the stakeholders have little knowledge of this concept. They are not totally aware of the concept. Only 24 % of the stakeholders found their knowledge as moderate in term of this concept. It is very surprising that none of the recycler found their knowledge as high knowledge and highly updated knowledge. It is not justified in any manner that persons dealing with e-waste have low level of knowledge about the concept.

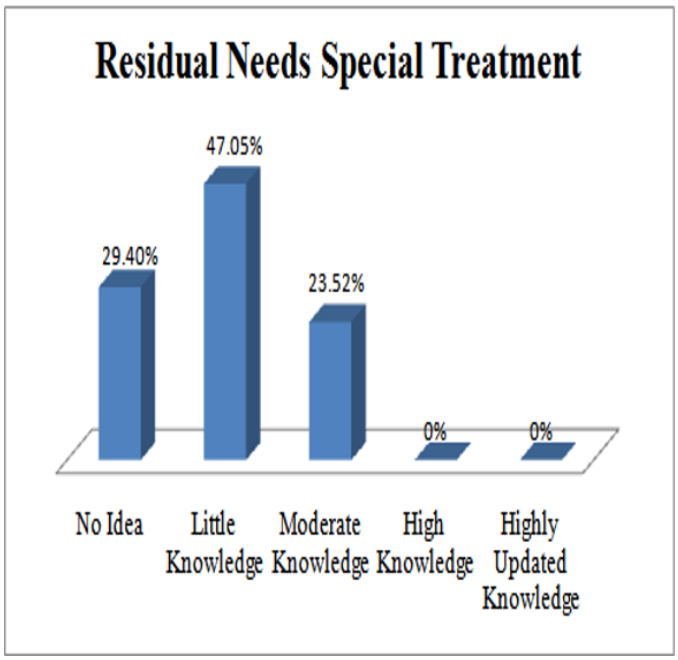

Figure 2: Residual left after recycling needs special treatment before disposal

Coming to the next question, this is about the impact of disposal methods on environment.

This is very important question as awareness regarding this concept is very necessary from environment safety point of view. But again result is not up to the satisfaction level as 35 % of the stakeholders are totally unaware that disposal methods they are using have any impact on environment. Half of the stakeholders have very little knowledge of the concept. Only 18 % of the stakeholders have moderate knowledge about the impact of disposal method on environment. None of the recycler either has high knowledge or highly updated knowledge about the impact of disposal methods on environment.

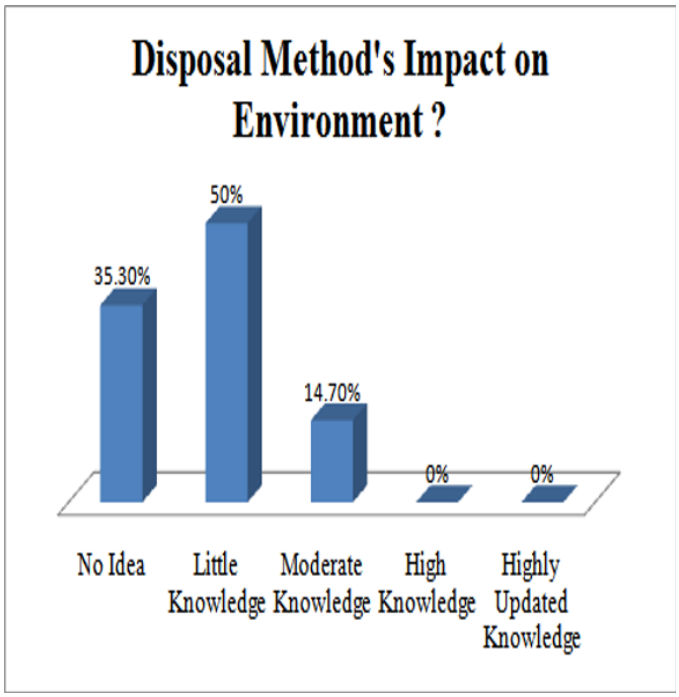

Figure 3: Impact of disposal method on environment

Next we want to know that how many of recyclers are concern for environment. This is very good to know that more than 70 % of the total stakeholders is agreed that they are concern for the environment. 21 % of the stakeholders are strongly agreed of the concept that they are concern for the environment. Approx 9 % stakeholders are neutral to the term. They are neither agreed nor disagreed for the concept. It very good to know none of the stakeholders is neither strongly disagreed nor disagreed about the term as shown in the figure below. Recyclers are doing recycling of e-waste for sake of environment.

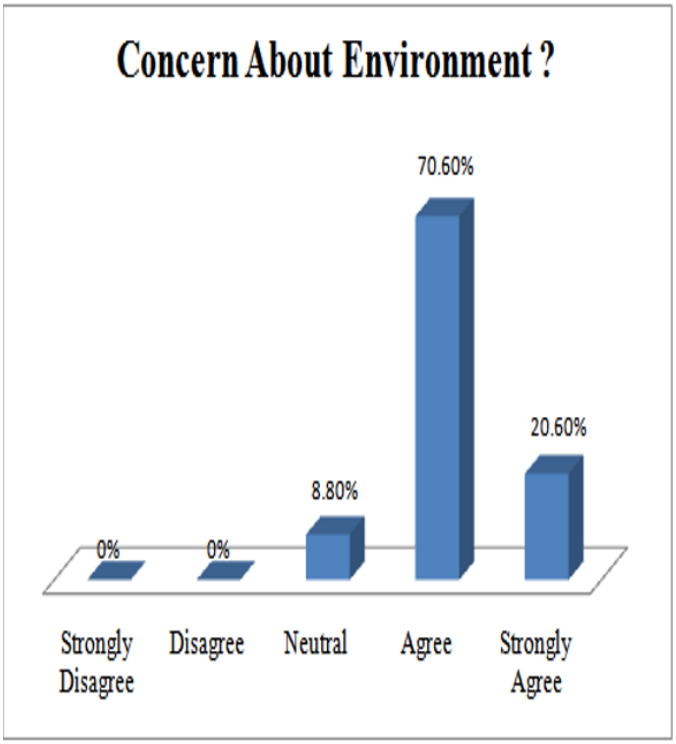

Figure 4: Recyclers concern about the environment

Next question is to check the knowledge of the end users approaches recyclers about benefits of e-waste management. About 32 % of stakeholders strongly disagree with the term that consumer's approaches him have good knowledge about the benefits of recycling of e-products. 41 % stakeholders are disagreed with the term. 21 % of stakeholders are neutral for the concept of knowledge of benefits of recycling. Only 6 % stakeholders agree that consumers approaches them have good knowledge about the benefits of recycling of e-products. None of the recycler is strongly agreed with the term. This shows the awareness level of the end user approaches to the recyclers. This is very important that consumers should have good knowledge of hazardous effect of the e-waste on their health. So government and manufacturers should consider the importance of this factor. They should also run some awareness campaigns by means of advertisements, flex, holdings etc in electronic media and print media.

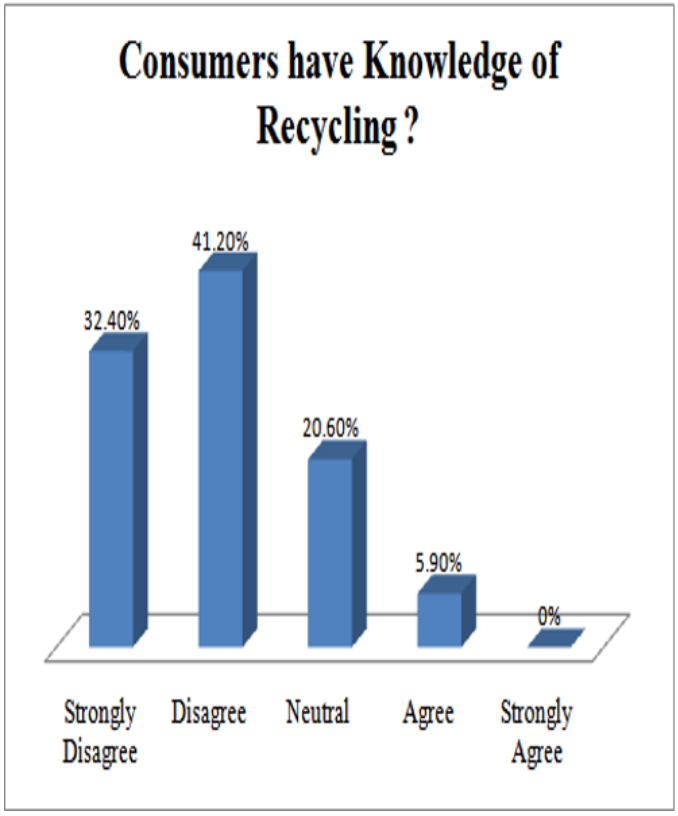

Figure 5: Knowledge of consumers about the benefits of e-product recycling

Next question is about the safety and health aspects of the workers working in the e-waste recycling units. The importance of this question is clear from the statement that e-products contains lead, cadmium, barium, chromium etc which have very adverse effect on human health. These types of materials cause some serious health diseases like kidney failure, cancer etc. The person working in the recycling unit have direct contact with these types of hazardous materials. So it becomes very essentials that recycling unit should take care of health and safety of the individuals. Response is also very satisfactorily as 47 % of stakeholders are agreed that they concern for safety and health of the workers working in his organization. On the other hand rest 53 % stakeholders are strongly agreed with the term. None of the recycler voted for strongly disagree, disagree and neutral.

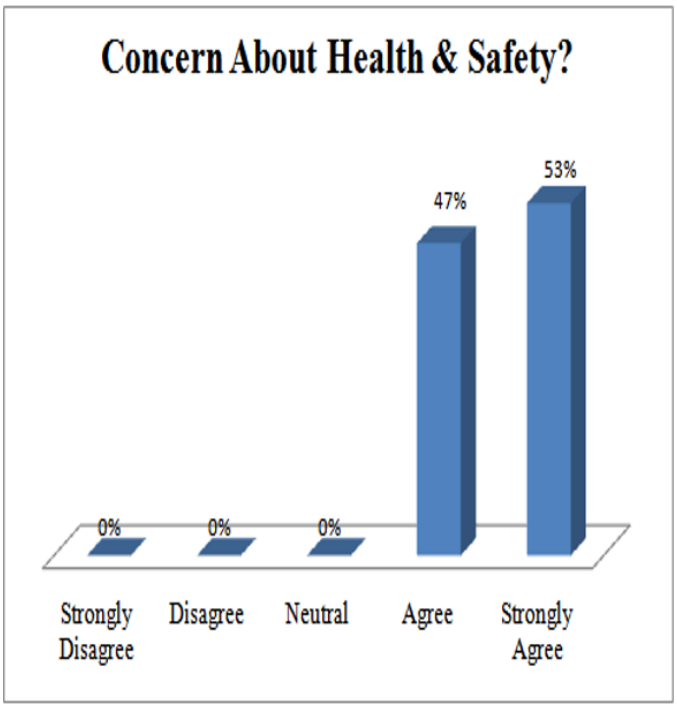

Figure 6: Recyclers concern of human health & Safety

Next we want to check that who is responsible for the growing amount of formal e-waste management in India. Approx 35 % stakeholders choose government initiatives as the main reason for growing amount of e-waste management in India. Approx 77 % stakeholders think that e-waste collection agencies are responsible for the increment in e-waste management in India. About 12 % stakeholders adopt both options. There is no role of NGO's, Municipal Corporation and awareness campaigns in the growing amount of formal e-waste management. Awareness campaigns are totally absent in India from govt. and recyclers ends. Also the manufacturers of e-products are not running any awareness programme regarding the negative impact of e-waste on human health. It is the prime duty of any manufacturer that they should run awareness campaigns so that end users get aware of the hazardous effects of the electronics devices on human health and the environment also.

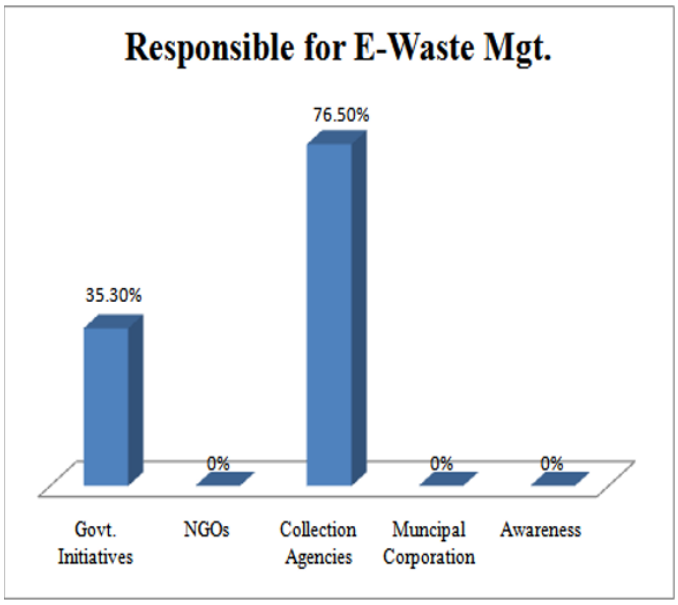

Figure 7: Who is responsible for growing amount of e-waste management in India?

Some of the components in electronics products are non recyclable which cannot be recycled. Our next question is about these products that how recyclers deal with this type of products. How they dispose of these non recyclable products. About 35 % of the stakeholders choose second hand market for these types of non recyclable products. They sell these components into second hand market so that they can be reused. Approx 85 % of the stakeholders just throw these components in the furnace. They do burning of these non recyclable components. More than 20 % of stakeholders agreed for both option of second hand market or burning of the components. None of the stakeholders have chosen for dumping in sea/river, donate to non-profit groups and just stored in their warehouse.

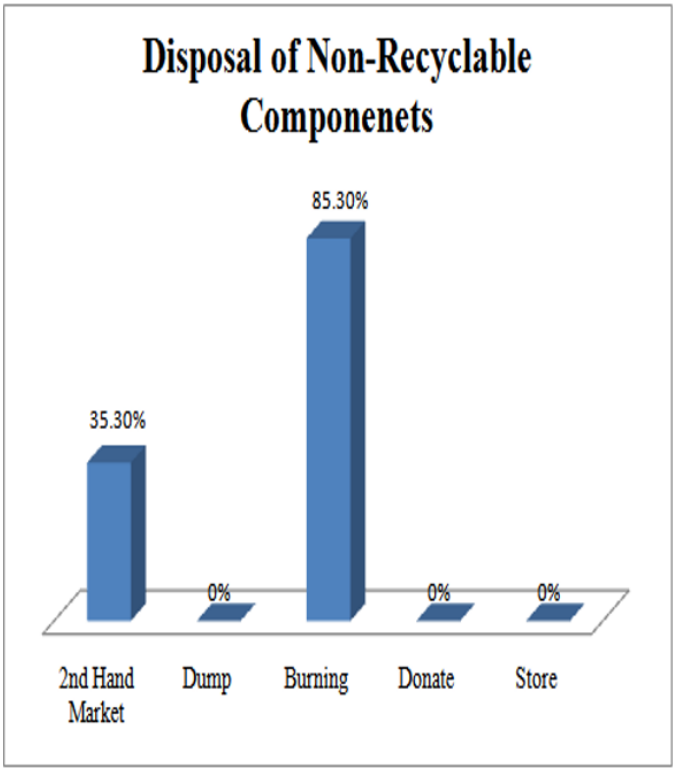

Figure 8: How you dispose non recyclable e-components?

CONCLUSION

This is very interesting to check the knowledge of recyclers about the hazardous effects of e-waste. The conclusion of this study is:

1. Awareness of recyclers regarding hazardous materials in e-products is very low. It is very serious issue as they are directly dealing with the hazardous materials.
2. Majority of recyclers are either totally unaware or very little knowledge that residual left after recycling process needs special treatment for its safe disposal.
3. Most of the recyclers are totally unaware about the impact of disposal method on environment. They don't think that disposal process have any impact on our environment.
4. Consumers approaching recyclers have no idea of benefits of recycling of e-products. Awareness level of the end users is not up to the standard.
5. Govt. should take initiative for Extended Producers Responsibly (EPR). In India manufacturers of electronics products have no worry of their safe disposal. So responsibility of the manufacturer should be fixed. Manufactures should run awareness programme to aware the end users about the hazardous effects of the electronic products.
6. Govt. of India should take initiative to run awareness campaigns so that peoples get aware about the adverse effect of e-waste on human health and environment also.

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