



E-waste management: A study

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Abstract

This study aims to assess the level of awareness among Dimapur citizens regarding electronic waste (E-waste) and to identify the primary challenges associated with E-waste management in the region. As the largest and fastest-growing city in Nagaland, Dimapur has witnessed a surge in its electronics market and technological advancements, resulting in heightened consumption of electronic and electrical equipment. However, with this rapid growth comes the pressing need to effectively manage the disposal and recycling of electronic waste to mitigate its adverse environmental and human health impacts. Through surveys and interviews, this research seeks to shed light on the current state of E-waste awareness and management practices in Dimapur, providing valuable insights for policymakers, environmentalists, and stakeholders to develop sustainable solutions for tackling the E-waste crisis in the region.

Keywords: E-waste, awareness, management, recycle, environment, health

Introduction

In recent decades, the growth of electronic devices has revolutionized modern life, driving unprecedented levels of connectivity, productivity, and convenience. However, this rapid advancement in technology has led to a parallel challenge: the management of electronic waste, or e-waste. E-waste, comprising discarded electronic devices and their components, poses significant environmental and health risks when improperly managed. Nestled in the northeastern region of India, Dimapur District in Nagaland grapples with the complexities of e-waste management amidst its unique socio-economic and geographic context. As urbanization and technological adoption accelerate in Dimapur, so too does the generation of e-waste. However, the district faces inherent challenges in effectively managing this waste stream, including inadequate infrastructure, limited awareness, and regulatory gaps. Against this backdrop, the study aims to comprehensively assess the current state of e-waste management in Dimapur District, Nagaland. By analyzing key dimensions such as disposal practices, regulatory frameworks, and stakeholder perceptions, we seek to identify critical barriers and opportunities for improving e-waste management practices.

1. Brief background

The increase of electronic devices in modern society has undoubtedly brought about unprecedented convenience and connectivity. However, this rapid advancement in technology has also given rise to a serious environmental and health challenge of electronic waste, or E-waste. E-waste consists of discarded electronic devices and components, including everything from smart phones and laptops to refrigerators and televisions. With the ever-shortening lifespan of electronic gadgets and the constant introduction of newer, more advanced models, the volume of E-waste generated globally continues to escalate at an alarming rate. The management of E-waste has emerged as a critical issue facing communities worldwide, posing

significant environmental, social, and economic implications. Improper handling and disposal of E-waste can lead to the release of hazardous substances into the environment, contaminating soil, water, and air, and endangering human health and ecosystems. Moreover, E-waste often contains valuable and scarce resources, such as rare metals and minerals, which, if not recovered and recycled efficiently, contribute to resource depletion and worsen environmental degradation. Against this backdrop, understanding and addressing the challenges associated with E-waste management has become essential for sustainable development and environmental administration. This study aims to investigate the specific dynamics of E-waste management in Dimapur District of Nagaland, India, examining the patterns of E-waste generation, current management practices, regulatory frameworks, and potential pathways for improvement. By delving into the unique context of Dimapur District, this research attempts to shed light on the complexities of E-waste management at the local level while offering insights and recommendations that can inform policy-making, community engagement initiatives, and technological interventions aimed at promoting responsible E-waste management practices. This study seeks to pave the way towards a more sustainable and circular approach to managing electronic waste, safeguarding both human health and the environment for present and future generations.

Naik (2016) ^[7], in his study stated that India's inadequate electronic waste management system, necessitating specific protocols for e-waste workers. Globally, the absence of a standardized e-waste definition hampers effective management. India faces technological, industrial, and regulatory obstacles, resulting in unregulated hazardous waste disposal amidst slow economic progress.

Awasthi et al. (2018) ^[1], presents a concise overview of e-waste challenges and management practices in India. They highlight the surge in e-waste due to rapid technology growth and consumerism, underscoring its environmental

and health risks. The study discusses Indian government initiatives and regulations, stressing the importance of sustainable recycling methods and collaboration among stakeholders for an effective e-waste management system.

Das (2017) ^[2], examines the current state of e-waste management in India, focusing on its sources and challenges. The paper highlights the environmental and health risks posed by electronic products containing toxic chemicals when improperly disposed. It emphasizes the difficulty of environmentally sustainable recycling, particularly in developing nations like India, where informal recycling often occurs near untreated waste sites, endangering workers. The study advocates for continuous awareness campaigns through diverse media channels to tackle the growing e-waste problem, especially in regions like India.

Sivaramanan (2013) ^[9], discusses e-waste management and its environmental impacts, focusing on the proper handling, recycling, and disposal of electronic devices like smart phones and laptops. Emphasizing the need for systematic management to mitigate environmental harm, the paper highlights the risks posed by hazardous substances like lead and mercury when e-waste is improperly discarded. It underscores the importance of effective strategies to reduce these impacts and conserve resources through recycling and responsible disposal practices.

Kiddee *et al.* (2013) ^[4], outlined essential strategies for effective e-waste management, including eco-friendly design, proper collection, safe recycling, suitable disposal, banning exports to developing nations, and raising awareness about e-waste consequences. These measures, though individually insufficient, can collectively combat the problem. Implementing national programs like Extended Producer Responsibility (EPR) is suggested as a beneficial policy to address the escalating e-waste issue.

Gupta and Sahay (2015) ^[3], stressed the significance of financial accountability for producers and the engagement of dedicated collection and recycling entities in Extended Producer Responsibility (EPR) policies. They emphasized three key components: regulatory measures, product take-back responsibility, and financial flow. The study noted adverse effects of the informal sector on EPR's regulatory aspects.

Sikdar & Vaniya (2014) ^[8] proposed integrating topics on e-waste disposal, recycling, and its health impacts into Environmental Education as a mandatory subject across all grades. They advocate for leveraging the education system as a potent tool for environmental protection, emphasizing early exposure to promote e-waste friendly behaviors in daily life.

Amit *et al.* (2018) ^[5], reviewed the potential utilization of e-waste in concrete and its environmental impact. They suggest using e-waste as an aggregate substitute in concrete to reduce reliance on natural resources. Strength development in e-waste concrete resembles that of conventional concrete. E-waste can serve as both fine and coarse aggregate, offering durability benefits. With millions of tons of e-waste generated annually worldwide, its use in concrete could mitigate resource depletion and environmental degradation. However, further research is needed to explore its broader applications in construction materials.

McAllister (2013) ^[6] states that globally, approximately 40 million metric tons of e-waste are generated annually, with

only around 13% recycled, mostly in developing nations. Treating e-waste in an environmentally friendly way is hazardous, complex, and costly, compounded by insufficient legislation and enforcement. Due to their toxic nature, electronic products pose risks to both the environment and human health, underscoring the importance of safe and proper disposal practices.

Widmer (2005), highlights that electronic products contain valuable metals like gold, iron, and copper (comprising around 60%), alongside other toxic pollutants (about 2.70%). Recovering these metals can diminish the need for mining and lower greenhouse gas emissions from manufacturing. Effective e-waste management is crucial not only for environmental preservation but also for obtaining these valuable materials. Both developed and underdeveloped nations encounter challenges in e-waste management.

Chowdhury and Patel (2017) ^[10], offer a thorough analysis of e-waste and its environmental and social impacts in their study, "E-waste Management and its Consequences: a Literature Review." They delve into the challenges of proper disposal and recycling of electronic devices, highlighting the adverse effects of inadequate management, including pollution, resource depletion, and health risks. The study likely discusses strategies for more sustainable e-waste management, making it a valuable resource for understanding this pressing issue.

Chi *et al.* (2010), studied informal e-waste management in China, highlighting its environmental and health risks, as well as the challenges in the current approach. They emphasize that simply prohibiting or competing with informal recyclers is ineffective. Instead, formal e-waste recycling systems should incorporate the existing informal sector, with policies aimed at improving recycling rates, working conditions, and efficiency. A key challenge for China's e-waste management is incentivizing informal recyclers to reduce improper recycling and divert more e-waste to formal recycling channels.

Binegde *et al.* (2015) ^[12], found that repair shops play a crucial role in prolonging the lifespan of electronic goods, thereby reducing e-waste. However, high repair costs and the availability of cheaper new goods with more features often encourage consumers to discard rather than repair, contributing to e-waste accumulation. They emphasize the importance of strengthening formal e-waste recycling for achieving sustainable development.

Othman (2015) ^[13], suggests that controlling the quantity of electronic waste requires a sustainable integrated approach covering its management from production to disposal. They advocate for new legislation to develop human capital for e-waste management, asserting that combining human capital with sustainable techniques will enhance efficiency in future e-waste management.

Effects of E-waste on human health and environment

Managing electronic waste (e-waste) is a complex task due to its diverse composition, which includes components containing harmful substances. Improper handling and disposal of E-waste can pose serious risks to both human health and the environment. Therefore, it's crucial to employ suitable technologies for handling and disposing of these hazardous chemicals. According to the Basel Convention, E-waste is considered hazardous if it contains or is contaminated with substances like mercury, lead, cadmium,

and polychlorinated biphenyl. Hazardous E-waste also includes materials such as insulation or metal cables coated with plastics containing lead, coal tar, cadmium, or PCB. Additionally, certain components like precious metal ash from printed circuit boards and glass waste from cathode-ray tubes, LCD screens, and activated glasses are classified as hazardous waste.

Significance of the study

Studying E-waste management holds immense importance in tackling the environmental and health challenges posed by the rapid accumulation of electronic waste in our modern world. E-waste contains hazardous materials that can pollute our soil, water, and air if not handled properly, leading to severe ecological damage and health risks for both humans and wildlife. Understanding how to manage E-waste effectively is crucial for minimizing these risks and promoting sustainable practices. By recycling and recovering valuable resources from electronic devices, we can reduce the strain on natural resources and mitigate the environmental footprint of electronics manufacturing. Moreover, investigating E-waste management allows us to identify gaps in current regulations and enforcement mechanisms, paving the way for stronger policies that ensure responsible disposal and recycling of electronic waste. This research also opens up economic opportunities by creating jobs in the recycling industry and fostering innovation in waste management technologies. Community engagement also plays a vital role in successful E-waste management, as raising awareness and encouraging participation can lead to more sustainable behaviors and practices among individuals and businesses. In essence, the study of E-waste management is not just about addressing a pressing environmental issue but also about safeguarding public health, conserving resources, fostering economic growth, and promoting environmental stewardship for a healthier and more sustainable future.

Objectives of the study

The present study aims to study the E-waste management of Dimapur district, Nagaland with the following objectives:

- To find out the current scenario and the major challenges of E-waste management in Dimapur.
- To find out the awareness of Dimapur residents regarding E-waste management and its environmental and health effects.
- To give suggestions dealing with the challenges and problems of e-waste.

Hypotheses of the study

- E-waste management in Dimapur might be a matter of concern.
- Most Dimapur residents might not be aware of the concept of E-waste and its impact on health and environment.
- The difficulties in managing E-waste in Dimapur may be due to resistance from the community and inadequate waste management practices.

Research questions

- What is the current scenario of E-waste management?
- Are people aware of E-waste and its impact on environment and health issues?
- What are the major challenges of E-waste management in Dimapur?

Methodology and Procedure

a. Research design

In this study a descriptive survey research design is employed which consists of both quantitative and qualitative approaches to gain understanding of the topic. The quantitative approach involves the collection and analysis of numerical data to assess the level of awareness of E-waste and its impact on health and environment among the residents of Dimapur district. While the qualitative approach focuses on capturing the subjective experiences and perspectives of the residents of Dimapur. Through observations, and textual analysis, the researcher delves into the level of awareness of E-waste and its impact on health and environment among the residents of Dimapur district. By employing both quantitative and qualitative methods, this study aims to offer a comprehensive and well-rounded analysis of the level of awareness and impact of E-waste among the residents of Dimapur district.

b. Population of the study

The population under this study consisted of the residents of Dimapur district, Nagaland, India. The population of Dimapur district according to the Census 2011 is 122,834 consisting of 64,300 male and 58,534 females.

Table 1: Population Table

Cities inside Dimapur District	Population
Dimapur (Municipal Committee)	122,834

c. Sample of the study

The sample is obtained using the "Simple Random sampling technique". Simple Random sampling is a probability sampling method used to randomly choose participants from a population. This method tends to produce representative, unbiased samples. A total of 167 respondents were taken for the study out of which 63 of them were male and 104 of them were female.

Table 2: Sample Selection from number of Colonies

Total no. of colonies	Male	Female	Total population
66	63	104	167

d. Tools of the study

The tools that are used for the study are questionnaire and interview schedule.

a. Questionnaire: For the purpose of data collection the researcher distributed questionnaire which contains both open-ended and close-ended question items. The question items are based on the hypothesis and objectives of the concerned study.

b. Interview Schedule: The researcher also conducted face-to-face interview or individual interview by visiting the site of the study.

e. Procedure for data collection

The researcher visited the various household in Dimapur district to engage the residents of Dimapur. During these visits, the researcher distributed the questionnaires and actively engaged in conversations with the people. These discussions revolved around the overall awareness level of the concept of e-waste, its disposal practices, challenges,

accessibility and effectiveness among the residents of Dimapur district. These conversations provided a valuable insights and firsthand perspectives related to the research topic. Subsequently, the researcher collected the completed questionnaires, ensuring that the gathered data accurately represented the experiences and opinions of the residents of Dimapur district. The questionnaire for survey was also distributed to some of the targeted group using Google form through WhatsApp.

Analysis and interpretation

Table 3: Percentile Grading Table

Sl.No.	Category/Percentage	Grade	Interpretation	Level of Awareness
1	0-20%	C	Not Satisfactory	Not aware at all
2	21-40%	B	Satisfactory	Awareness level is satisfactory
3	41-60%	A	Good	Awareness level is average
4	61-80%	A+	Very Good	Awareness level is high
5	81-100%	O	Outstanding	Awareness level is very high

Based on the percentile grading table, the analysis and interpretation of objectives and hypotheses is carried out as follows:

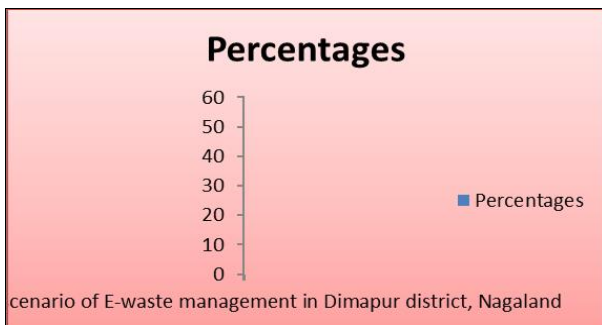


Fig 1: Current scenario of E-waste management in Dimapur district, Nagaland

From the above figure 1, it is indicated that in the current scenario of E-waste management in Dimapur district, Nagaland, the frequency obtained is 1529 out of the total of 2839. Consequently, converting into percentage it is 53.86%. It can be interpreted with the help of table 3: Percentile grading table that 53.86% falls into the grade A category which means it is just average. It means that the current scenario of E-waste management in Dimapur district is just average and hence so much more needs to be done to improve the condition of E-waste management and its practices.

f. Statistical Techniques

The data for this study was collected and analyzed using SPSS 22.00, a statistical software program commonly used for data analysis. To assess the reliability of the measurement instrument, the Cronbach’s Alpha method was employed. Additionally, item analysis was conducted using the one-sample t-test, which allowed for the calculation of means, standard deviations, and t-scores for the individual items.

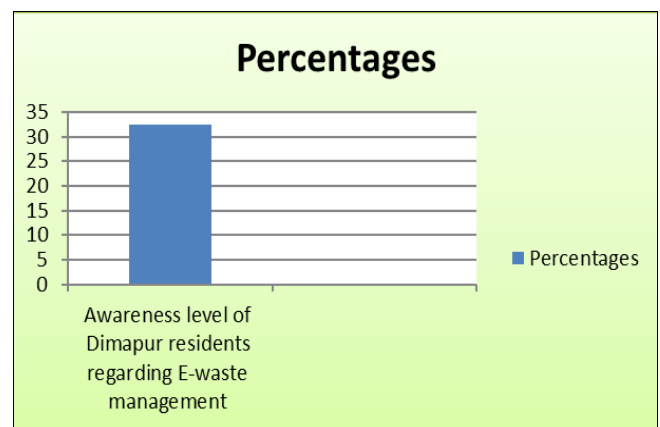


Fig 2: Awareness level of Dimapur residents regarding E-waste management

From the above figure 2, it is indicated that in the awareness level of Dimapur residents regarding E-waste management the frequency obtained is 324 out of the total of 1002. Consequently, converting into percentage it is 32.34%. It can be interpreted with the help of table 3: Percentile grading table that 32.34% falls into the grade B category which means it is just satisfactory. It means that the awareness level of Dimapur residents regarding E-waste management is just satisfactory and thus more awareness programs on the proper management of E-waste and its impact on human health and environment should be carried out so that more people are aware of it.

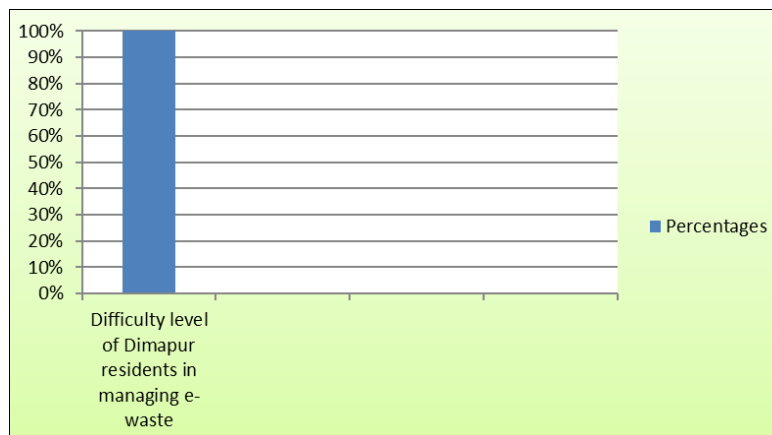


Fig 3: Difficulty level of Dimapur residents in managing e-waste

From the above figure 3, it is indicated that in the difficulty level of Dimapur residents in managing e-waste, the frequency obtained is 1263 out of the total of 2839. Consequently, converting into percentage it is 44.49%. Therefore, it can be interpreted with the help of table 3: Percentile grading table that 44.49% falls into the grade A category which means it is just average and thus it shows that the residents of Dimapur are struggling to manage E-waste and are not happy with the existing regulations, accessibility and effectiveness of management practices and policies of e-waste.

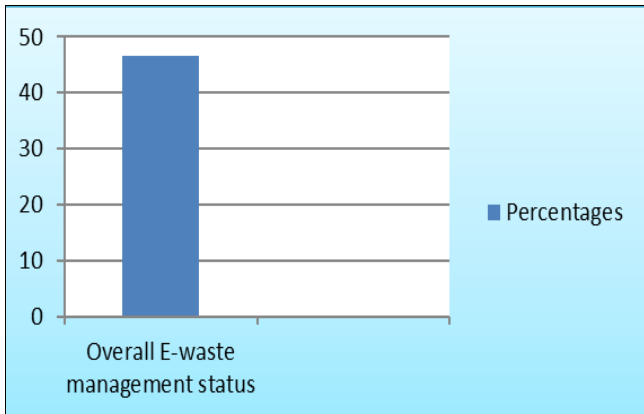


Fig 4: Overall E-waste Management status

From the above figure 4, it is indicated that in the overall E-waste management status in Dimapur district, Nagaland, the frequency obtained is 3118 out of the total of 6680. Consequently, converting into percentage it is 46.68%. It can be interpreted with the help of 4.1 percentile table that 46.68% falls into the grade A category 41-60%, which means it is average. Therefore, the government along with the responsible citizens should work cooperatively to enhance the overall condition and management of E-waste in Dimapur district.

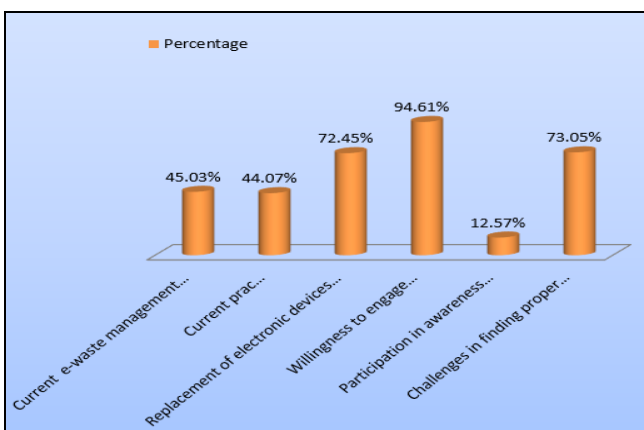


Fig 5: Current Scenario and Major Challenges

From the above figure 5, Q1 (current condition of E-waste management) it is indicated that the frequency obtained is only 376 out of 835 which means that only 45.03% is satisfied with the current condition of E-waste management in Dimapur. While in Q2 (current practice for disposing old electronic devices at home) it is indicated that the frequency obtained is 368 out of the total of 835 consequently converting it to 44.07% which means that the current practice used for disposing old electronic devices at home is

just average and hence it needs to be improved more. However, in Q3 (upgradation or replacement of electronic devices in the household) it was found that 72.45% of the people upgrade or replace their electronic devices only after 3-4 years or depending upon the longevity of the device.

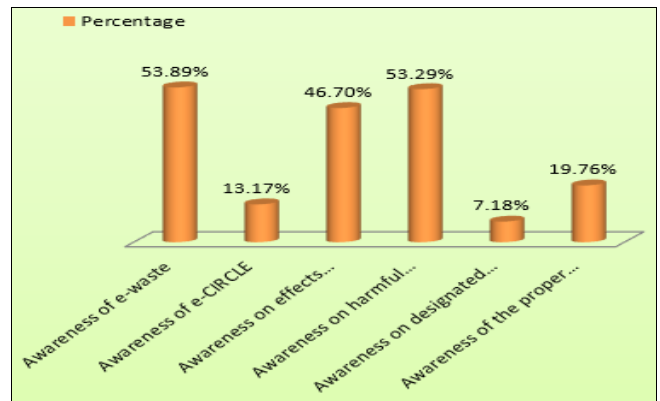


Fig 6: Status of Awareness and Effect on Environment and Helath

Furthermore, in Q4 (willingness to support/engage in community driven E-waste collection and recycling initiatives) it was found out that 94.61% of the population is willing to participate in activities related to E-waste initiatives which shows an excellent enthusiasm to work towards the betterment of the society. In Q5 (whether participated in any awareness programs or initiatives related to e-waste) it is indicated that only 12.57% of the population has participated in programs related to E-waste which can be understood that either the people were not aware of any such programs being organized or no such programs were ever organized. Lastly, in Q6 (challenges in finding proper channels for recycling specific electronic components) it is clearly seen that 73.05% of the population have faced challenges in finding proper channels for recycling purposes.

In the above figure 6, in Q7 (awareness of E-waste) it is indicated that only 90 people out of 167 are aware of what an E-waste is. Consequently, when it is converted into percentage, it can be interpreted that only 53.89% of the total population are well aware of e-waste. Many of the people still don't know what is E-waste. While in Q8 (awareness of e-Circle) it was found out that only 13.17% of the total population knows about e-Circle which is the only and first ever authorized E-waste collection centre in Nagaland. Furthermore, in Q9 (awareness on effects of improper disposal of e-waste) it can be seen that only 46.70% of the population are aware of the effects of improper disposal of e-waste. More than fifty percent of the population are still unaware of the ill effects of improper disposal of e-waste. In Q10 (awareness on harmful effects of E-waste on environment) it can be interpreted that 53.29% of the total population are aware of the harmful effects of E-waste on environment and health. In Q11 (awareness on designated E-waste collection points) only 7.18% of the total population are aware of the designated E-waste collection points in their own locality. Lastly, in Q12 (awareness of the proper methods for disposing of electronic wastes) only 19.76% are aware of the proper methods for disposing of electronic wastes which means that most of the people are just dumping the E-waste along with other garbage.

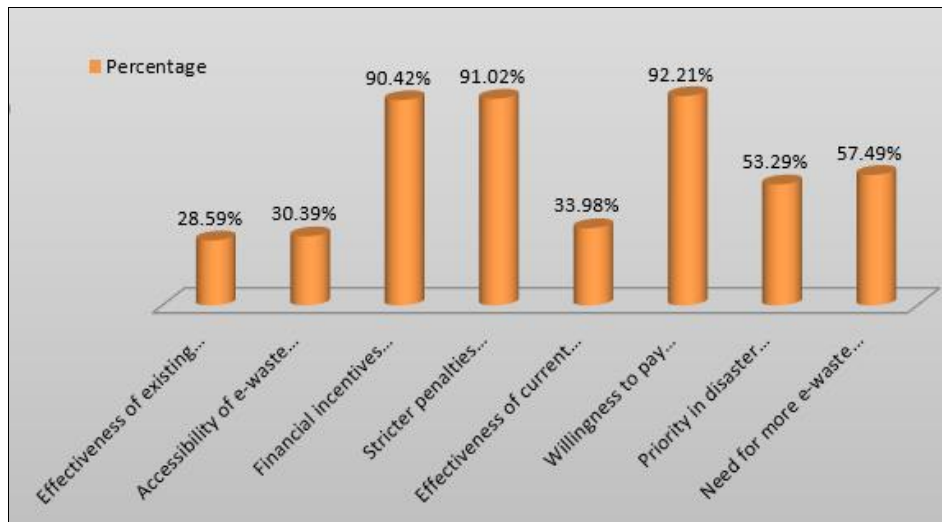


Fig 7: Status of challenges and Problems of e-waste

From the above figure 7, it is indicated that in Q13 (effectiveness of existing regulations and policies regarding E-waste management) the frequency obtained is 191 out of the total of 668 which means that only 28.59% of the total population are satisfied with the effectiveness of the regulations and policies of E-waste management. In Q14 (accessibility of E-waste disposal services) only 30.39% of the total population are satisfied with the accessibility of E-waste disposal services which means that the accessibility for disposal of E-waste is very less. While in Q15 (whether financial incentives would encourage better E-waste management practices) a majority of the population i.e. 90.42% are in support of the view that financial incentives would encourage better E-waste management practices in Dimapur. Similarly, in Q16 (support for stricter penalties for improper E-waste disposal to deter violations) 91.02% are in support for stricter penalties for improper E-waste disposal. In Q17 (effectiveness of current E-waste regulations in Dimapur) only a few population i.e. 33.98% are satisfied with the effectiveness of the existing E-waste regulations in Dimapur. However, in Q18 (willingness to pay a small fee for proper E-waste disposal services) it was also found out that a population of 92.21% are willing to pay a small fee for proper E-waste disposal services. In addition, in Q19 (whether E-waste management should be a priority in disaster management plans) it was also of the view of 53.29% population that E-waste management should be a priority in disaster management plans and in lastly, in Q20 (whether there is a need for more E-waste research and education) 57.48% of the population felt the need and importance of more E-waste research and education.

Analysis according to the Hypothesis

a) **H1:** E-waste management in Dimapur might be a matter of concern.

Table 4: Current scenario of E-waste management in Dimapur district.

Category	Frequency	Total	Percentage (%)
E-waste management matter of concern	1529	2839	53.86%

From the table 4, it is clearly seen that 53.86% of the respondents are currently aware of E-waste management in Dimapur district. On the other hand, 46.14% of the

respondents are not aware of E-waste management in the current scenario. From this figure it can be concluded that almost half of the respondents are not aware of the E-waste management. Therefore, it is truly a matter of concern on the administration of E-waste management in Dimapur district. Finally, the constructed hypothesis, “E-waste management in Dimapur might be a matter of concern” is retained.

b) **H2:** Most Dimapur residents might not be aware of the concept of E-waste and its impact on health and environment.

Table 5: Status of Awareness and Effect on Environment and Health

Category	Frequency	Total	Percentage (%)
Awareness level of Dimapur residents regarding E-waste management	324	1002	32.34%

From the table 5, it can be seen that only 32.34% of the respondents are aware about E-waste and its management in Dimapur district. On the other hand, 67.66% of the respondents are not aware of E-waste and its management. Therefore, it can be concluded that most of the residents of Dimapur district are still not aware of E-waste and its sources, management, impacts, etc which is a very serious problem. Finally, the hypothesis, “Most Dimapur residents might not be aware of the concept of E-waste and its impact on health and environment” is retained.

c) **H3:** The difficulties in managing E-waste in Dimapur may be due to resistance from the community and inadequate waste management practices.

Table 6: Status of challenges and Problems of E-waste

Category	Frequency	Total	Percentage (%)
Difficulty level of Dimapur residents in managing E-waste	1263	2839	44.49%

From the above table 6, it can be seen that only 44.49% of the respondents are not facing difficulty in managing E-waste in Dimapur district. While a majority of 55.51% of the respondents are facing difficulty in managing E-waste

such as less accessibility of E-waste disposal services, less designated E-waste collection points, challenges in finding proper channels for recycling specific electronic components and so on. Therefore, the hypothesis, "The difficulties in managing E-waste in Dimapur may be due to resistance from the community and inadequate waste management practices" is retained.

Major Findings and discussions

1. According to the objectives,

- a. The current scenario of E-waste management in Dimapur district is just average awareness.
- b. The awareness level of Dimapur residents regarding E-waste management is not satisfactory.
- c. The residents of Dimapur are struggling to manage E-waste and are not happy with the existing regulations, accessibility and effectiveness of management practices on policies of e-waste.

2. Findings according to dimensions related to current scenario of E-waste management

- a. 45.03% of respondents are satisfied with the current condition of E-waste management in Dimapur.
- b. 72.45% of the respondents upgrade or replace their electronic devices after 3-4 years depending upon the longevity of the devices.
- c. 94.61% of the respondents are willing to support/engage in community driven E-waste collection and recycling initiatives.
- d. 12.57% of the residents participated in awareness programs or initiatives taken by the administration related to e-waste.
- e. 73.05% of the respondents faced challenges in finding proper channels for recycling purposes.

3. Findings according to dimensions related to the status of awareness and effect on environment and health:

- a. Only 53.89% of the respondents are aware of E-waste management.
- b. 13.17% are aware of e-CIRCLE related to E-waste management.
- c. 46.70% of the respondents are aware on effects of improper disposal of e-waste.
- d. 53.29% of the respondents are aware of harmful effects of E-waste on environment.
- e. 7.18% of the respondents are aware on designated E-waste collection points.
- f. 19.76% of the respondents are aware of the proper methods for disposing of electronic waste.

4. Findings according to dimensions related to the status of challenges and problems of e-waste

- a. 29.59% of the respondents are aware of effectiveness of existing regulations and policies on E-waste management.
- b. 30.39% of the respondents are able to get access of E-waste disposal services.
- c. 90.42% of the respondents stated that financial incentives would encourage better E-waste management practices.
- d. 91.02% of the respondents expressed that support for stricter penalties must be implemented for improper E-waste disposal to deter violations.

- e. 33.98% of the respondents expressed that they are satisfied with the effectiveness of the existing E-waste regulations in Dimapur.
- f. 92.21% of the respondents expressed their willingness to pay a small fee for proper E-waste disposal services.
- g. 53.29% of the respondents expressed that E-waste management must be treated as a priority by the Nagaland Pollution Control Board.
- h. 57.48% of the respondents expressed that there is a felt need and importance of more E-waste research for creating better awareness.

5. Findings related to hypothesis

H1: E-waste management in Dimapur might be a matter of concern.

- a. The constructed hypothesis, "E-waste management in Dimapur might be a matter of concern", is retained. It means hypothesis is not rejected.

H2: Most Dimapur residents might not be aware of the concept of E-waste and its impact on health and environment.

- b. The constructed hypothesis, "Most Dimapur residents might not be aware of the concept of E-waste and its impact on health and environment", is also retained. It means hypothesis is not rejected.

H3: The difficulties in managing E-waste in Dimapur may be due to resistance from the community and inadequate waste management practices.

- c. The constructed hypothesis, "The difficulties in managing E-waste in Dimapur may be due to resistance from the community and inadequate waste management practices", is retained. It means hypothesis is not rejected.

Suggestions

- a. Awareness programs should be organized more often so that people are not ignorant about the concept of e-waste. More awareness should be carried out on the impact of E-waste on human health and environment.
- b. There should be modifications in the existing regulations of E-waste for a better accessibility, efficiency and effectiveness of management practices and policies.
- c. The government along with the responsible citizens should work collaboratively to enhance the overall condition and management of E-waste in Dimapur district.
- d. It is suggested to involve the community members to support and engage in E-waste collection by taking initiatives and to create programs in such a way that more people will participate.
- e. It is suggested that the authorities concerning E-waste management must visit various locations and initiate proper channels for recycling with proper transportation.
- f. Create awareness on e-circle management.
- g. It is suggested to create awareness on effects of improper disposal of E-waste through community participation and on proper methods for disposing electronic wastes.
- h. The authorities must also sensitize the community members on harmful effects of E-waste management on

environment by conducting programs through various schemes like Swachh Bharat, Atmanirbhar Bharat, National Smart Cities Mission, etc.

- i. The authorities of E-waste management must fix a designated E-waste collection points at various locations in Dimapur.
- j. It is suggested that action-oriented program must be organized on effectiveness of existing regulations and policies on E-waste management.
- k. There must be proper accessibility and disposal of E-waste services.
- l. As it is mentioned that 90.42% of the residents are ready for financial support for better E-waste management practices, the authorities must create funds and organize activities for E-waste management.
- m. Stricter actions and penalties must be imposed on the citizens who violate rules on E-waste disposal.
- n. The authorities concerning E-waste management can create, organize funds from the local residents for disposal services.
- o. It is a matter of concern that E-waste management should be stressed on priority ground by the concerned authorities.
- p. It is suggested to the authorities as well as the residents to encourage projects, researches, and surveys to undertake relating to E-waste management.

Conclusion

This research shed light on the state of E-waste management in Dimapur District, Nagaland, revealing critical insights into awareness levels, challenges, and potential avenues for improvement. Through a comprehensive analysis of the data collected, several key conclusions can be drawn: Firstly, it is evident that the current scenario of E-waste management in Dimapur is characterized by average awareness among residents. Despite efforts to raise awareness through various initiatives, a significant portion of the population remains uninformed about the concept of E-waste and its implications for human health and the environment. Furthermore, the findings highlight significant challenges faced by Dimapur residents in managing E-waste effectively. From inadequate regulations and accessibility to dissatisfaction with existing management practices, there is a clear need for comprehensive reforms to address these issues and enhance the overall condition of E-waste management in the district. The study also underscores the importance of community engagement and collaborative efforts between the government and citizens to improve E-waste management practices. Suggestions such as organizing frequent awareness programs, modifying regulations for better accessibility, and involving community members in E-waste collection initiatives are crucial steps towards fostering a culture of responsible E-waste management in Dimapur. Moreover, the overwhelming support for financial incentives, stricter penalties for improper disposal, and the prioritization of E-waste management in Nagaland Pollution Control Board underscore the urgency of addressing this issue at both the policy and grassroots levels. In conclusion, the findings of this research emphasize the need for concerted efforts from all stakeholders to address the challenges associated with E-waste management in Dimapur District. By implementing the suggested recommendations and fostering greater awareness, collaboration, and accountability, it is possible to

pave the way for a more sustainable and effective approach to E-waste management, thereby safeguarding the health and well-being of Dimapur residents' and the environment for generations to come.

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