

**Assessing the Hluttaw Members' Awareness of Municipal Solid Waste
Management
(Case Study on the 2020 Elected Hluttaw Members)**

Inn Thar(D5), Hikari (D1), Ei Mon Kyaw (A3), Kyaw Thet Tun (D2), Ei Ei Khaing (D4) and Nyein Chan

July, 2024

ABSTRACT

The rapid economic growth in Myanmar, combined with urbanization and industrialization, has led to significant waste management challenges, particularly concerning the lack of proper waste handling infrastructure. Hluttaw representatives, as key stakeholders with legislative power, play a crucial role in addressing these challenges by enacting relevant legislation focused on municipal solid waste management. This research assesses the awareness and interest of Hluttaw members elected in 2020 concerning environmental conservation, with a specific emphasis on solid waste management. Data was collected using questionnaires containing six sections with the total questions of 29 through social media platforms such as Facebook, Telegram and by email. We collected the responses from 33 elected Hluttaw members within a month. The results showed that 90% of the elected Hluttaw members demonstrated good awareness in solid waste management, scoring above 23 out of 46, with the highest awareness in the solid waste collection sector (93.94%) and the lowest in waste management processes (54.55%). Notably, 63.64% had a solid general understanding of waste, 84.85% were knowledgeable about waste separation, but only 4 members were aware of international agreements related to waste. Overall, the findings reveal that Hluttaw members show strong interest in environmental conservation, particularly in waste collection and separation, though there is room for improvement in broader waste management practices. To improve waste management in Myanmar, better data collection and specific information on waste generation are essential. It is also recommended to provide waste management training and workshops on international conventions for Parliament members, while engaging the public through extension programs and environmental education from an early age. Additionally, parliamentarians should propose policies that support transforming waste disposal systems into energy production and adopt a bottom-up approach for more inclusive waste management strategies.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	Error! Bookmark not defined.
ABSTRACT	i
TABLE OF CONTENTS	ii
LIST OF FIGURES.....	i
LIST OF TABLES.....	ii
LIST OF ABBREVIATIONS	ii
1. INTRODUCTION	1
2. PROBLEM STATEMENT	2
3. OBJECTIVES	3
4. RESEARCH METHODOLOGY	3
4.1. Sample Size and Sampling Strategy	3
4.2. Design of the Survey Questionnaires and Marking Scheme.....	4
4.3. Data Analysis	5
5. RESULTS AND DISCUSSIONS	7
5.1. Respondents' characteristics	7
5.2. Elected Hluttaw members' personal interests on environmental conservation	9
5.3. Elected Hluttaw members' awareness in solid waste management.....	9
5.3.1. General understanding on solid waste.....	10
5.3.2. Solid waste collection	13
5.3.3. Solid waste separation	16
5.3.4. Solid waste management processes	18
6. CONCLUSION	27
7. RECOMMENDATIONS	28
REFERENCES	29

LIST OF FIGURES

Figure 1. Respondents' characteristics by (a) Gender, (b)Experience in Hluttaw, (c) Education background and (d) Age.....	7
Figure 2. Constituencies of parliament members won in 2020	8
Figure 3. Status of parliament member's interest in environmental sector.....	9
Figure 4. Status of parliament member's awareness in the field of solid waste	9
Figure 5. Consideration of respondents about waste disposal as priority issue to solve	10
Figure 6. Assumption of respondents about waste problems as key issues to solve.....	12
Figure 7. Individual score of respondents in general understanding on solid waste	13
Figure 8. Assumption for sources of largest amount of solid waste generation by the respondents.....	13
Figure 9. (a) Waste collection, (b) collection times per week, (c) Assumption of respondents on waste collection by MDC and (d) requirements for sufficient waste collection	15
Figure 10. Individual scores of respondents in solid waste collection.....	16
Figure 11. (a) Personal behavior in sorting and disposing of waste by respondents and (b) disposing waste regardless of classification.....	16
Figure 12. (a) Response of the participants on waste classification on the guidelines of YCDC and MCDC and (b) assumption of the largest amount of solid waste disposal type in respective elected townships by respondents.....	17
Figure 13. Individual score of respondents in solid waste separation.....	18
Figure 14. Average solid waste generation per capita per day in Myanmar in 2025	19
Figure 15. (a) Opinion of respondents on unregulated garbage disposal and (b) its impacts on environment	19
Figure 16. Condition of waste disposal sites in respective constituency.....	20
Figure 17. (a) Stakeholders that should be involved in waste management and (b) condition of fund for solid waste management (adequate or not).....	22
Figure 18. Recommendation of respondents to solid waste reusing and recycling	23
Figure 19. (a) Assumption of respondents on penalties regarding solid waste in Myanmar and (b)having prepared for waste management plans in their respective constituency	24
Figure 20. Individual score of respondents in solid waste management	25

Figure 21. International conventions and agreements related to solid waste signed by Myanmar25

LIST OF TABLES

Table 1. Respondents’ opinion on main challenges to solve waste disposal issue in their constituencies..... 11

Table 2. Respondents’ significant reasons to provide designated waste disposal sites ..21

Table 3. Respondents’ recommendation to solve waste disposal issue.....26

LIST OF ABBREVIATIONS

1. ADB - Asia Development Bank
2. ECD - Environmental Conservation Department, Myanmar
3. GDP - Gross Domestic Product
4. ID - Identity or Identification
5. LGBTQIA+- Lesbian, Gay, Bisexual, Transgender, Queer or questioning, Intersex, Asexual and more
6. MSW - Municipal Solid Waste
7. MDC - Municipal Development Committee
8. MCDC - Mandalay City Development Committee
9. NIOS - National Institute of Open Schooling
10. PMs - Premenstrual Syndrome
11. UEC - Union Election Commission, Myanmar
12. UNDP - United Nations Development Programme
13. UNFPA - United Nations Population Fund
14. YCDC - Yangon City Development Committee

1. INTRODUCTION

Nowadays, the world is facing several environmental problems (Kyaw, 2019), many of which cannot be resolved, even though the environment is very influential in all aspects of life and its impact is very significant for human life (Kollmuss J., Agyeman J., 2002). Some of the notable problems of the environment can be identified as (1) land, air and water pollution (2) population growth (3) urbanization and (4) industrialization (NIOS, 2008). In this study, we will focus on land pollution, specifically waste problems.

After decades of isolation, Myanmar's economy is experiencing rapid growth exceeding 6% GDP every year, positioning it as one of the fastest-growing economies in Asia since a series of political and economic reforms in 2011 (ADB, 2018). According to UNFPA (2019), there is an estimated population of about 51.1 million in Myanmar in 2019. As the environment and human societies are closely related (Shin, 1997), the rapid economic growth with urbanization and industrialization has led to significant challenges with the management of waste in Myanmar. Typically, between one-third to two-thirds of generated waste in many townships is not properly managed, causing pollution to both surface and groundwater (ECD, 2018).

Nowadays, waste management is considered a central part of the concept of sustainable development. Waste is referred to as something that poses a negative impact towards the environment. Meanwhile, sustainable waste management refers to the activity of utilizing natural resources more efficiently (Saat, 2014). In developing countries, characterization of solid wastes are unfavorable economic, institutional, legislative, technical and operational constraints (Imam, 2008). In the case of Myanmar, as one of developing countries, there exists no accurate and reliable data on the total waste generation in the country. Traditionally, waste collection and disposal in Myanmar were the responsibility of respective township development committees. However, the recycling activities in many cities are mostly carried out by the informal sector, including scavengers, waste collectors, and waste dealers. At present, waste collected by the township development committees is transported and dumped to designated disposal sites located within their territories, without any further waste management processes. To cope with this issue, the National Waste Management Strategy and Master Plan is set as the first initiative in relation to waste management in Myanmar in 2020 (ECD, 2018). However, the implementation of this plan is still challenging at the local government level.

According to the World Bank (1999), waste management is among the three major environmental issues commonly suffered by most local governments due to unsustainable practices of landfill. Guerrero et al. (2013) pointed out that adequate legislation influences the performance of the waste management system particularly in the aspect of policy. In line with this, a significant number of Hluttaw members suggested that lawmaking was their primary focus and responsibility (UNDP, 2019). Given the crucial role that parliament members play in enacting new legislation, this research will focus on the attention of Hluttaw¹ representatives toward environmental conservation, specifically waste management, in Myanmar.

This research focuses on the awareness of Hluttaw representatives, who won the 2020 election in Myanmar, regarding environmental conservation, particularly solid waste management. It aims to offer valuable insights into the priorities of elected Hluttaw members concerning environmental conservation and municipal solid waste management, emphasizing their crucial role in enacting relevant legislation.

2. PROBLEM STATEMENT

Municipal solid waste management is a global challenge with each type of waste presenting unique treatment and disposal procedures. The waste management sector requires significant improvements to handle the growing amount of waste generated. The main challenge is the inadequate infrastructure, resulting in open dumping and waste burning which contribute to pollution and health hazards. In developing countries, rapid urbanization and population growth exacerbate municipal solid waste (MSW) issues (Bhardwaj, 2023).

¹ The term 'Hluttaw', a royal word used in Burmese King's time, historically refers to the council of ministers in the king's court in pre-colonial Burma (Myanmar) (Aung, 1967). The *Pyidaungsu Hluttaw* is a bicameral body made up of a 440-seat House of Representatives (*Pyithu Hluttaw*) and the 224-seat House of Nationalities (*Amyotha Hluttaw*), totaling 664 members. 75% (498 members) are directly elected by voters, while the remaining 25% (166 members) are military personnel appointed by the Defence Services' Commander-in-Chief (UEC, 2010). Besides, the State and Regional Hluttaw consists of a total 880 members with 75% (660 members) directly elected by voters and the remaining 25% (220 members) appointed by the Defence Services' Commander-in-Chief (UEC, 2020).

In Myanmar, waste problems are escalating due to limited information on waste generation, improper management, inadequate legislation and poor awareness of environment conservation. Addressing waste issues is crucial for sustainable urban and rural development. Effective waste management necessitates adequate regulations and legislation. As Hluttaw members have the legislative power of enacting and debating new legislations, they are key stakeholders in resolving waste problems occurring in Myanmar. Their interest in environmental conservation is essential for long-term sustainable development in Myanmar. Therefore, assessing the awareness and interest of Hluttaw members in environmental conservation, particularly in municipal solid waste management is a critical first step.

3. OBJECTIVES

The main objective of this study is to assess the interest and awareness of Hluttaw members, elected in 2020 General Election, regarding environmental conservation with a specific focus on solid waste management.

The specific objectives are: -

1. To evaluate the personal interests of elected Hluttaw members in environmental conservation, and
2. To assess the awareness of elected Hluttaw members concerning environmental conservation, specifically their understanding of solid waste, including collection, separation and management processes.

4. RESEARCH METHODOLOGY

For this study, a judgmental sampling method was applied. Data was collected using questionnaires through social media platforms such as Facebook and Telegram, as well as by email. The survey questionnaire was prepared in Burmese Language, using the Google Form. That Google Form link was shared to elected Hluttaw members, and all the responses were recorded in Excel sheets.

4.1. Sample Size and Sampling Strategy

Among the targeted populations, some of the PMs who are still dealing with Myanmar's Coup Military were excluded for the sake of security concerns due to the current condition in Myanmar. When we distributed the Google Form to the remaining PMs, we could collect the responses from 33 elected Hluttaw members within a month.

4.2. Design of the Survey Questionnaires and Marking Scheme

The questionnaire was designed in six sessions to assess environmental conservation awareness of elected Hluttaw members on municipal solid waste management. At the beginning of the survey form, we described our objectives of this survey, stating that there would be six sections which would take about fifteen minutes to complete the answer. We also mentioned the ethical standards, committing that personal information will be kept as anonymous as possible, and adding that the information obtained from the survey will not be used for other purposes rather than this research and obtaining their free, prior and informed consents.

In section one, basic socio-demographic information of each respondent such as name, age, education level, constituency terms of their service were collected. The information gathered from this section was mostly used to describe the respondents' characteristics.

The second section focused on solid waste, including four questions to assess Hluttaw members' environmental conservation interest and knowledge about solid waste. The two questions related to the definition of municipal solid waste and solid waste management process, accounting for the scores with a total of 8 marks.

The third section included questions about solid waste collection, covering five questions: (1) whether the Municipal Development Committee (MDC) comes to pick up garbage in his or her constituency, (2) whether the waste disposal sites designated by MDC in his constituency are sufficient in number, (3) whether there is unregulated littering in his or her constituency, (4) average daily solid waste generation capacity per capita in Myanmar in 2025 and (5) whether to track and store the solid waste produced by the houses is sufficient for the municipality in his or her constituency . Among the questions, only three of them were scored with a total of 10 marks.

The fourth section about solid waste separation section was composed of (1) how to classify the types of solid waste, (2) classification of waste by Yangon City Development Committee (YCDC) and Mandalay City Development Committee (MCDC), (3) largest amount of solid waste disposal type in their constituencies, (4) whether solid waste should be collectively disposed, regardless of classification and (5) the place where the largest amount of solid waste is disposed. In this section, all the questions are taken into consideration of scoring with a total of 12 marks.

The fifth section consisted of several questions about solid waste management. These are (1) ways that should be selected and used to dispose of solid waste from residential houses, (2) those who should be involved in waste storage and management, (3) whether their constituency has solid waste management plans, (4) whether funds being spent on solid waste management are adequate, (5) whether recyclable solid waste should be used and (6) whether there are any fine or penalties imposed by law regarding solid waste in Myanmar. Also in this section, all questions except whether their constituency has solid waste management plans were counted to score with a total of 11.

The last section was constructed with general questions about solid waste management. This section was formed with the questions of: (1) awareness of any international conventions or international agreements related to solid waste that Myanmar has signed, (2) the key points to solve the solid waste problem and (3) recommendations to solve the solid waste problem. In this section, only question (2) was considered to count in marking with rating 5 marks.

The total score for all six sections was 46, in which each section carried 8, 10, 12, 11 and 5 respectively, excluding section one which is to collect basic socio-demographic information of each respondent.

4.3. Data Analysis

Firstly, we checked all the collected data and coded them in an appropriate way to enable it to be analyzed in Microsoft Excel 2013. Among the collected data, one Hluttaw member refused to answer three questions: two from the second section and one from the last section. Considering some missing values, we analyzed the data in each section. Mostly in this research, we applied descriptive statistics to reflect our objectives.

Even we focused on the PMs who won 2020 General Election in Myanmar, some PMs have experienced winning the previous terms. Therefore, we collected the data about PMs' served duration from 2016. Based on that, we analyzed Hluttaw members' served duration in the first term (2016-2020) and second term (2020- now). The first term Hluttaw members are who won for the first time in the 2015 election in parliament while the second ones are who consecutively won for the second time in 2020 election. All the respondents are still serving at present.

Then, examining the respondents' education background, we categorized the respondents into three education levels: post-graduate, graduate and under-graduate according to their responses. Furthermore, the respondents are between 31 and 72 years old Hluttaw members. Afterwards, we divided the respondents' ages into 10-year-intervals, which are five ranges: 31-40, 41-50, 51-60, 61-70 and 71-80.

We set the percentage level of personal interests on environmental conservation as 0-20%, 21-40%, 41-60%, 61-80% and 81% and above, and then made Hluttaw members choose.

When we analyzed the data about the five main sections out of six in the questionnaire, we classified the questions into four parts: (1) general understanding on solid waste, (2) solid waste collection, (3) solid waste separation and (4) solid waste management processes. After reclassifying like this, the general understanding of the solid waste category carries a total maximum score of 9, covering 3 questions. For solid waste collection, there are three questions and two are considered graded up to 7 while the solid waste separation category is made up of four questions with a total score of 10. The last solid waste management process is formed with ten questions with a total score of 20, in which nine are considered in scoring. Hence, the total maximum score for single individual respondents is 46.

There are several questions which were not taken into account in giving score and asked to know Hluttaw members' personal interest on environmental conservation such as whether waste disposal is prioritized as the key issue in his/her constituency, whether the Municipal Development Committee (MDC) comes to pick up garbage in his or her constituency, whether the waste disposal sites designated by MDC in his/her constituency are sufficient, whether his/her constituency has solid waste management plans, awareness of any international conventions or international agreements related to solid waste that Myanmar has signed, and recommendations to solve the solid waste problem.

5. RESULTS AND DISCUSSIONS

5.1. Respondents' characteristics

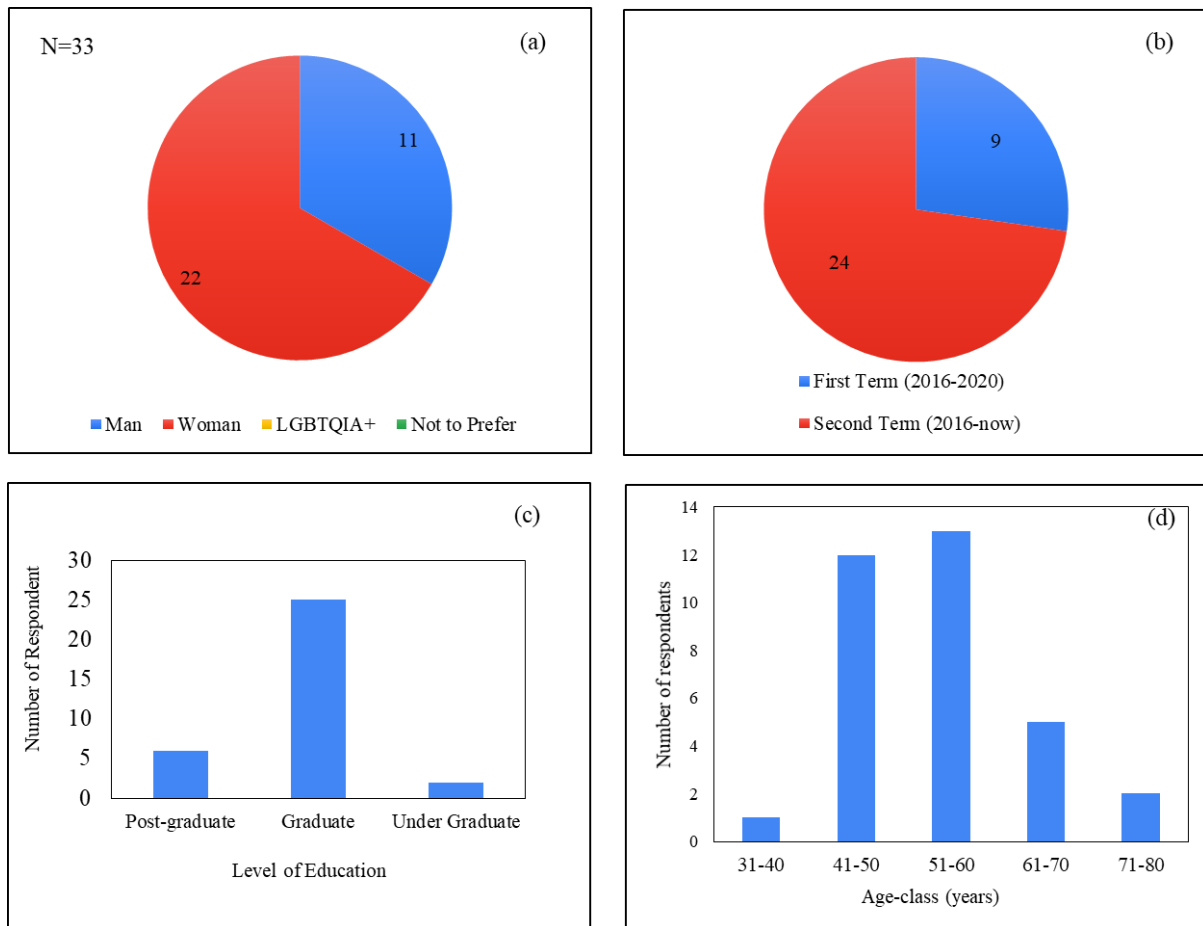


Figure 1. Respondents' characteristics by (a) Gender, (b) Experience in Hluttaw, (c) Education background and (d) Age.

Based on our survey, most of the respondents are female Hluttaw members (67% of the total respondents) while the remaining 33% are male (Figure 1(a)). Even though male members are greater in number in Hluttaw, the female Hluttaw members seem to be more interested in solid waste management. Another possibility is that our survey did not reach other male Hluttaw members.

We also questioned the terms of their service in Hluttaw. Our findings showed that about three-quarters of the respondents are serving their second term (2016-now), while the remaining one-quarter are newly elected parliament members from the 2020 general election (Figure 1(b)).

In our survey, the majority of the respondents are graduates (60% of the total respondents), and there are 3 undergraduate Hluttaw members whereas about a quarter are postgraduate with 8 individuals as shown in Figure 1(c).

In Figure 1(d), there is only one respondent in the 31-40 age-interval. Then, there are 13 respondents in the 41-50 age interval whereas there are 12 in the 51-60 age interval respectively. Moreover, 15% of parliament members within the 61-70 age interval participated in the survey and 2 from 71-80 age interval. Therefore, the majority of the survey responses are dominated by the 41-60 age-range Hluttaw members.

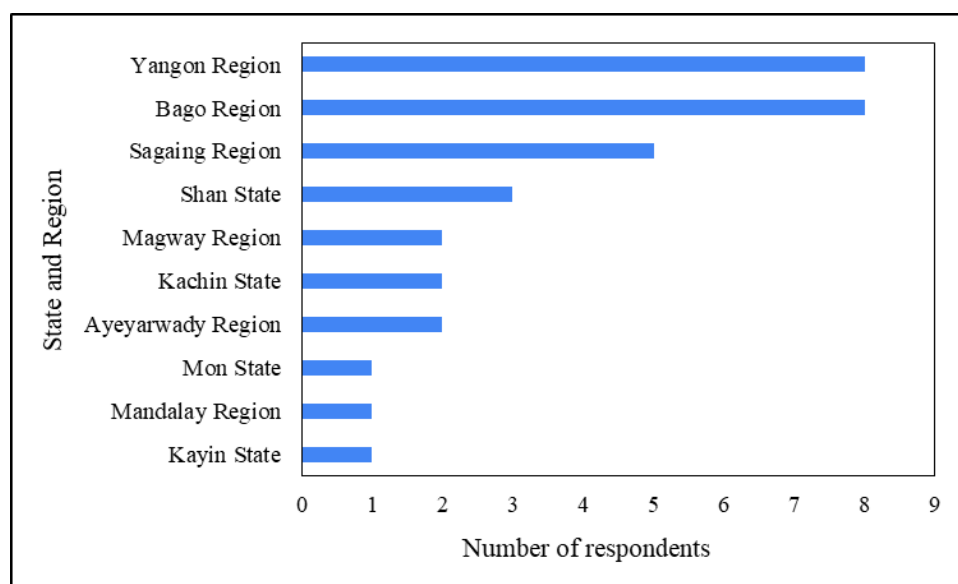


Figure 2. Constituencies of parliament members won in 2020

According to our survey as in Figure 2, the Hluttaw members from both Yangon and Bago regions hold the maximum numbers with an equal account of 8, making each 24.2% of responses in spite of the reactions of parliament members not covering the constituencies of some areas such as Kayah state, Chin state, Rakhine state, Tanintharyi region and Naypyidaw union territory. Five members are from constituencies of Sagaing region and three from Shan state, making up 15.2% and 9.1% respectively (Figure 2). The constituencies from Kachin state, Ayeyarwaddy and Magway regions have two respondents evenly equal. Besides, there is only one respondent in each of Mon state, Kayin state and Mandalay region.

5.2. Elected Hluttaw members' personal interests on environmental conservation

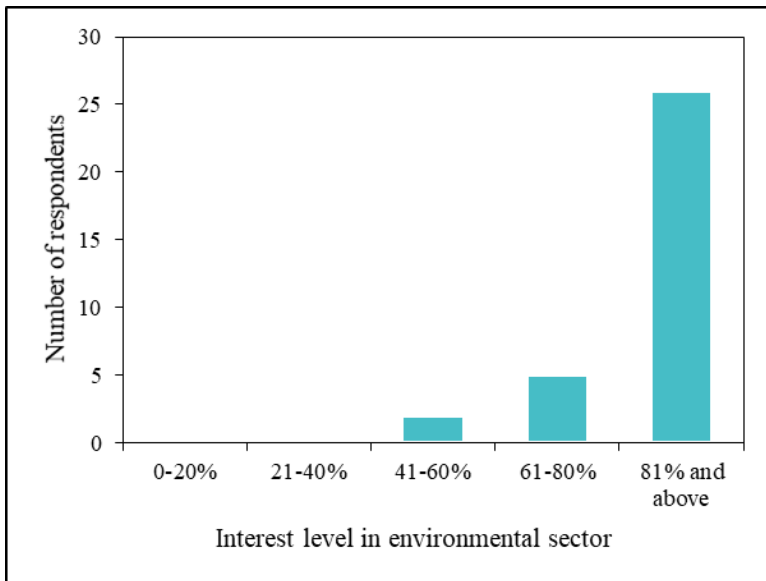


Figure 3. Status of parliament member's interest in environmental sector.

When we surveyed their interest in environmental conservation, most of the respondents showed their high interest. Out of 33 sampled PMs, 26 respondents showed their highest interest level (81% and above), followed by five Hluttaw members in second highest interest level (61-80%) and only one in interest level of 21-40% (Figure 3). It implied that the elected Hluttaw members showed their strong interest in the environmental conservation sector.

5.3. Elected Hluttaw members' awareness in solid waste management

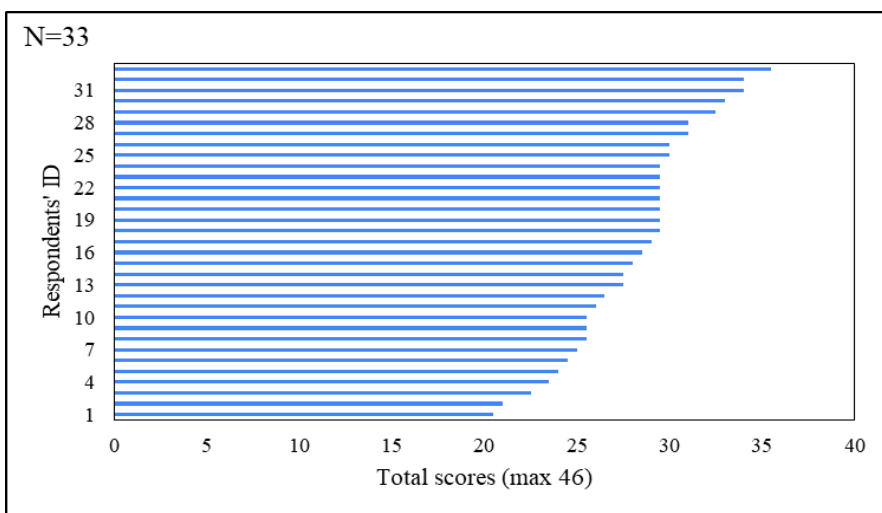


Figure 4. Status of parliament member's awareness in the field of solid waste

When we assessed the environmental conservation knowledge of Hluttaw members, focusing on solid waste management by our marking scheme (total score of 46 for all 16 questions), all the Hluttaw members showed their score of 20 and above shown in Figure 4. The highest score of Hluttaw members was 35.5 while the lowest score was 20.5. Based on our findings, Hluttaw members' awareness is in general sound in environmental conservation related to solid waste.

5.3.1. General understanding on solid waste

When we made an inquiry about the term "solid waste", we found that all respondents need to understand fully or sometimes partially the meaning of the term despite their interest being high in environmental conservation.

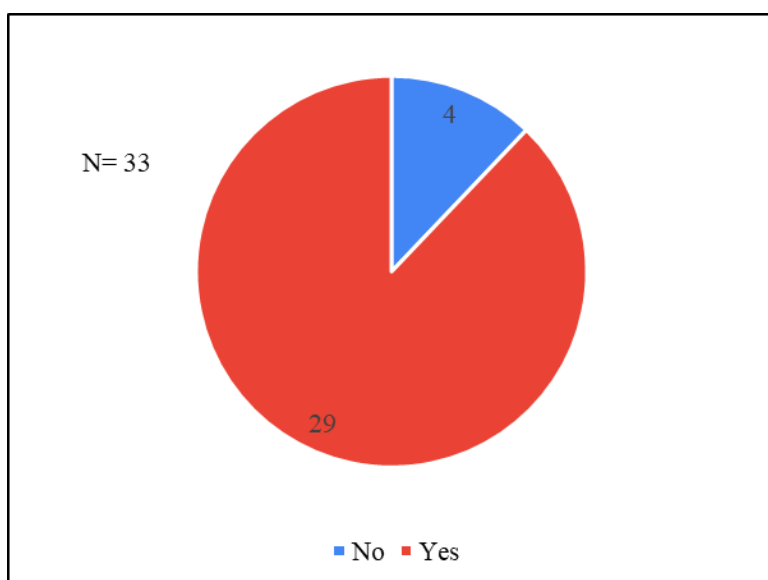


Figure 5. Consideration of respondents about waste disposal as priority issue to solve.

When we raised the question of whether there is any priority issue regarding waste disposal in his or her constituency, the number of respondents who consider that his/her constituency regarding waste disposal are not prioritized are only four and who think that there is priority issue are 29 (Figure 5). It presents that almost 88% of the Hluttaw members consider waste disposal in his or her constituency as priority issues. It gives a good opinion that they can consider waste management in their future served duration/duties in parliament. It can be generalized that the respondents are rich in knowledge about environmental conservation and will have solutions to cope with environmental problems in their constituencies.

Following the ‘Yes’ answer to the question of waste disposal as a priority issue in his or her constituency, we attempted to detail what will be the main challenges to be solved in the waste management system in their constituencies. Based on their feedback (Table 1), the main challenge, because the waste disposal is prioritized in their constituencies, is due to landfilling (11), followed by waste collection (8) and awareness (4). Based on our findings, municipal solid waste management can be initiated, considering landfilling, and waste collection and awareness raising to solve the waste disposal problems. Few respondents (n=2) pointed to weakness to count in law making and enforcement. It suggests that Hluttaw members know themselves to be involved in law making and enforcement about solid waste management.

Table 1. Respondents’ opinion on main challenges to solve waste disposal issue in their constituencies

Waste management process	No. of respondents
Waste Separation	3
Waste Collection	8
Waste Processing	0
Landfilling	11
Source Reduction	1
Recycling and Composting	1
Resources	
a. Conversion Technologies	2
b. Awareness	4
c. Human Resources	1
d. Budget (Funding)	2
e. Transportation Vehicles	0
Law making and Enforcement	8

Besides, when we asked about the key challenges to solve waste problem as a whole in Myanmar: (i) human resources, (ii) living standard, (iii) technology, (iv) finance and (v) environmental knowledge, all the Hluttaw members pointed out to provide environmental knowledge to the public while 85% of Hluttaw members also vote for finance and 79% for technology (Figure 6). Based on their responses, Hluttaw members understand well the fact that the public need to be provided knowledge and awareness about environmental conservation in Myanmar.

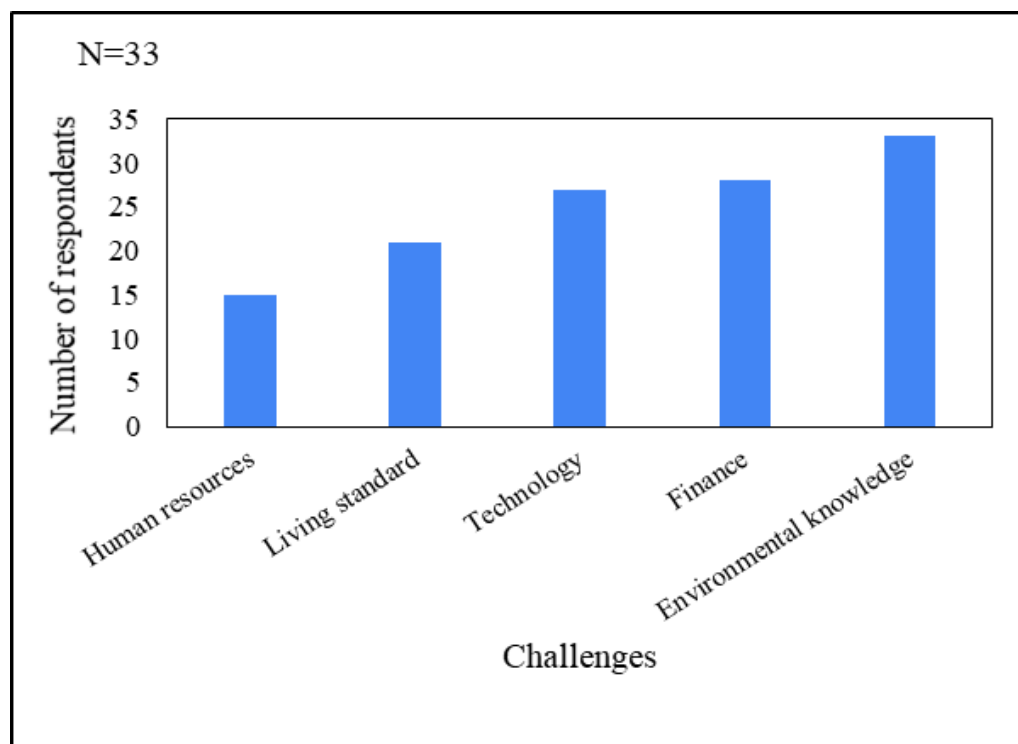


Figure 6. Assumption of respondents about waste problems as key issues to solve

According to three survey questions based on general understanding of solid waste in which the total score is 9, three Hluttaw members attained the highest score of 7 out of 9 while the minimum score of one member is 2 in figure 7. Among the total score of 9 for three questions about general understanding of solid waste, 36% (n=12) of Hluttaw members gained a score under 4 out of 9, and then 64% of members attained over 5. It can be concluded that over three-fifths of Hluttaw members have a high level of interpretation on solid waste.

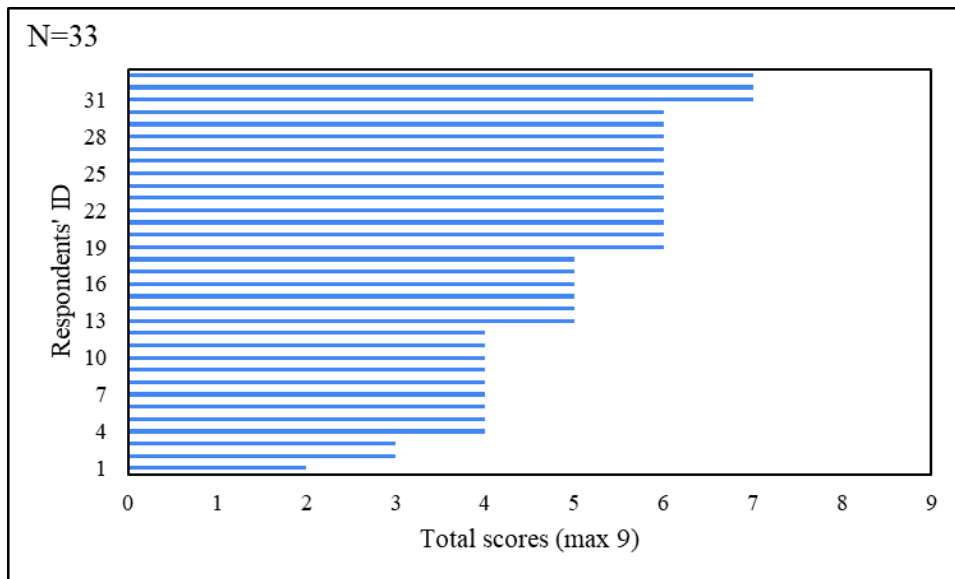


Figure 7. Individual score of respondents in general understanding on solid waste.

5.3.2. Solid waste collection

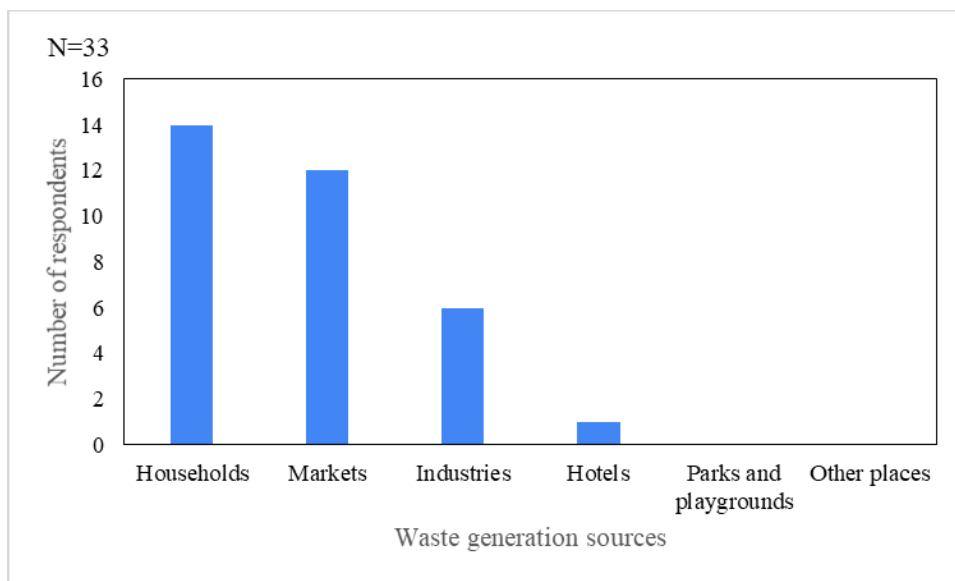


Figure 8. Assumption for sources of largest amount of solid waste generation by the respondents.

To choose the place among households, markets, industries, park and playground and other places, where the constituency produces the most solid waste, the 14 respondents hit the correct answer of households (Figure 8). 42% of Hluttaw members recognize the place of most solid waste production.

When we raised a question on whether the Municipal Development Committee (MDC) came to collect solid waste in his or her constituency, 28 Hluttaw members responded

that the MDC came to pick up garbage in their constituencies whereas five members (one from Bago Region, two each from Sagaing Region and Shan State) feedbacked that MDC did not come to pick them up (Figure 9(a)).

Following “Yes” respondents to the above-mentioned question, MDC staff in Yangon region (n=3) and Magway region (n=1) came to pick up garbage daily (Figure 9(b)). There are nine regions or states where MDC staff come to pick up garbage twice a week: three from Bago region, two each from Ayeyarwady and Sagaing regions equally and one from Kayin and Mon states equivalently. Also, there are seven members who answered that MDC staff came to pick up garbage once a week – one from Bago region, Magway region and Mandalay region equally, two from Kachin state and Yangon region evenly balanced. There are six respondents who are not sure how many times the MDC staff comes to pick up garbage in their constituencies. Moreover, when we made inquired whether it is sufficient for the municipality in his or her constituency to track and store the solid waste produced by the houses, only three respondents from Bago, Sagaing and Yangon regions reported “sufficient” while others from remaining thirty regions said, “not sufficient” (Figure 9(c)). Our finding suggests that most of the places in Myanmar are not sufficient for the municipality to track and store the solid waste produced by the houses.

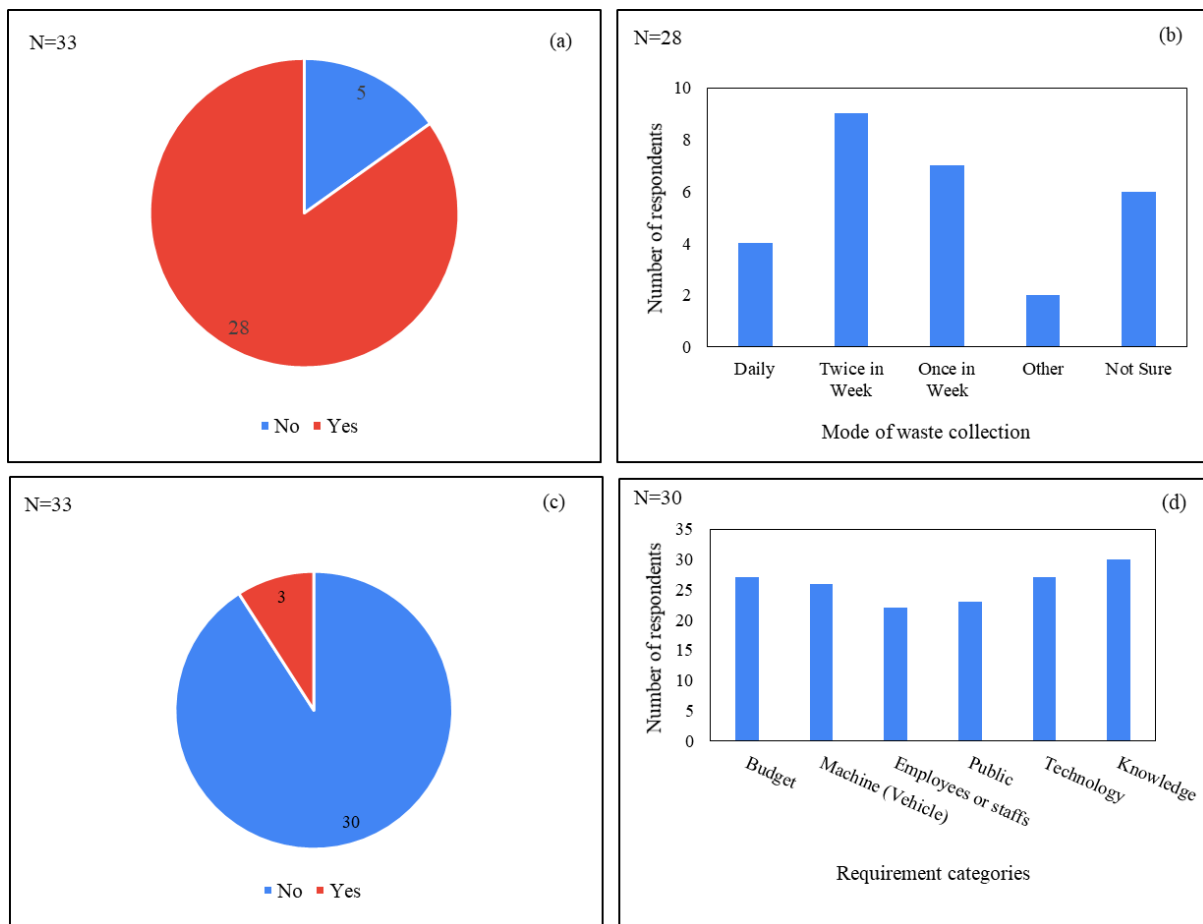


Figure 9. (a) Waste collection, (b) collection times per week, (c) Assumption of respondents on waste collection by MDC and (d) requirements for sufficient waste collection.

When we asked for their advice for the municipal development committee to adequately track and store solid waste produced by the houses, 100 % of the members responded that knowledge is the most important factor, following technology or methods and finance equally (90%), equipment vehicles (87 %), public involvement (77%) and employees or staffs (74%) (Figure 9(d)).

Regarding solid waste collection in which three questions are included, 30% (n=10) of Hluttaw members hit the highest score of 7 out of 7. Concerned with solid waste collection, 15% (n=5) of respondents attained a score under 4.5 while the last 85% caught the score above 5 as shown in figure 10. Most of Hluttaw members have a good knowledge and high awareness about solid waste collection.

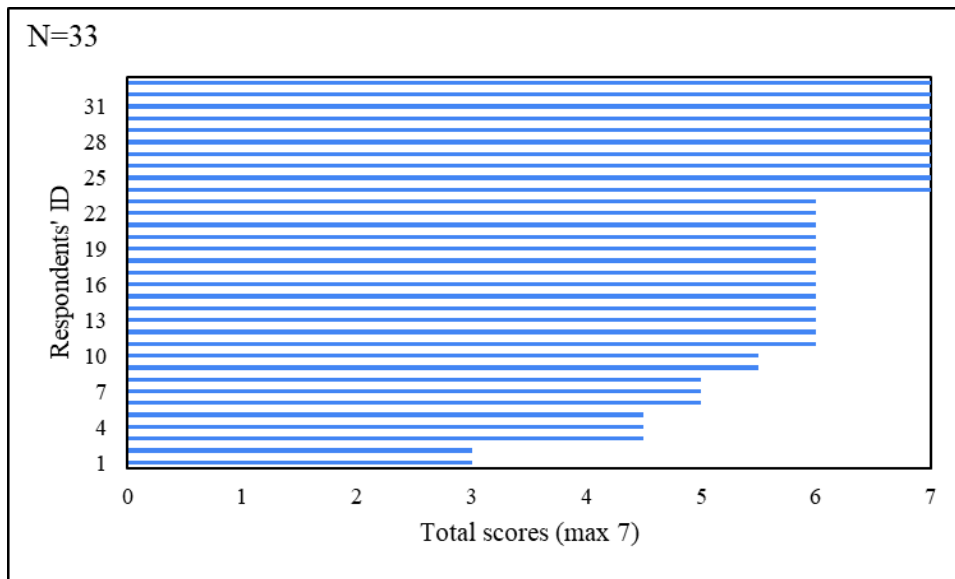


Figure 10. Individual scores of respondents in solid waste collection.

5.3.3. Solid waste separation

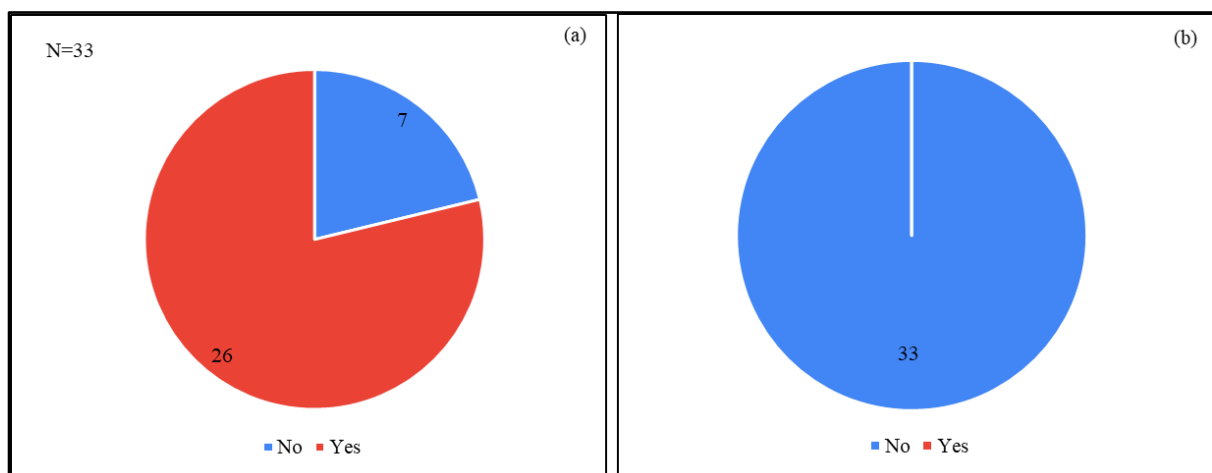


Figure 11. (a) Personal behavior in sorting and disposing of waste by respondents and (b) disposing waste regardless of classification.

When we asked about solid waste separation, seven Hluttaw Members do not separate solid waste whereas 26 members separate when they dispose of solid waste (Figure 11(a)). It suggests that most of the parliament members (about 79 %) separate solid waste, implying that most of Hluttaw members have awareness and right and good knowledge of solid waste separation. To make it fully aware, some awareness-raising programmes may also need to be provided to the Hluttaw members.

In contrast, when we asked whether solid waste should be disposed of collectively regardless of classification, all the members replied that solid waste should not be

disposed of collectively (Figure 11(b)). This means that all the members have the sense of disposing of solid waste by classifying or sorting them. In other words, it can be clearly said that Hluttaw members have good and proper knowledge of solid waste separation. Therefore, if good and proper guidance, laws and provisions are enacted in Myanmar, it will be better in solving problems related with solid waste separation. At present, to formulate guidance, laws and provisions about solid waste separation is essential for Myanmar.

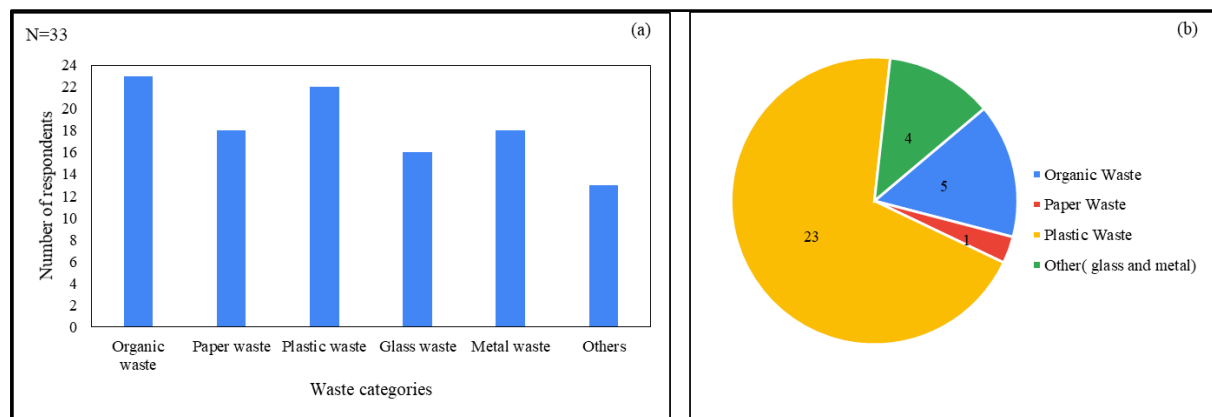


Figure 12. (a) Response of the participants on waste classification on the guidelines of YCDC and MCDC and (b) assumption of the largest amount of solid waste disposal type in respective elected townships by respondents.

The Yangon City Municipal Development Committee (YCDC) and the Mandalay Municipal Development Committee (MCDC) have already classified solid wastes and prescribed the different types of solid waste in their respective guidelines. When we asked Hluttaw members to choose the types of solid waste classification, four parliament members chose all categories prescribed by YCDC and MCDC while others chose only some categories from them (Figure12 (a)). That means 12% of Hluttaw members are fully aware of the solid waste classification by YCDC and MCDC. MDC in Myanmar is poor in the publication process to the public, including to the parliament. MDC's guidelines should transparently reach more to the public. This type of all-inclusive ways will lead to a better result to solid waste separation in Myanmar.

The subject of the largest amount of solid waste disposal type in their elected townships, five members of parliament react to the correct answer of organic waste whilst most of the members reply that plastic waste is the largest amount of solid waste disposal type in their elected townships as shown in Figure 12(b). Although the largest

amount of waste disposal type is organic waste from residential houses, these wastes are combustible and easily decomposed whereas plastic waste cannot be decomposed. This may be why most members probably assume that plastic waste is the largest solid waste disposal type.

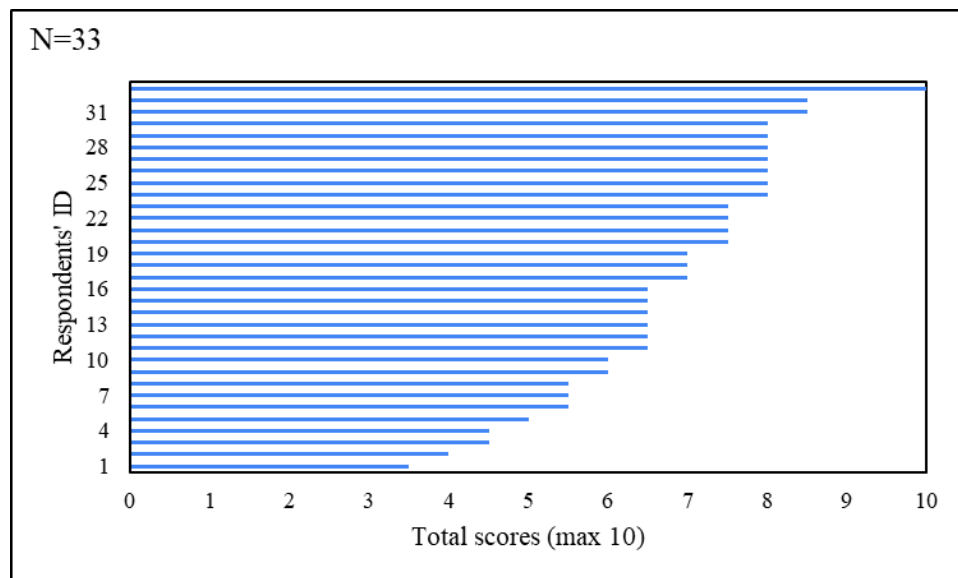


Figure 13. Individual score of respondents in solid waste separation

Based on our marking scheme for solid waste separation in which there are 4 questions (total score of 10), one member could earn the fullest score of 10 whereas the lowest score of one member is 3.5 (Figure 13). 15% (n=5) members are under half the total score of 10 and all other 85% (n=28) members' score is over 5.5 out of 10. Our finding suggests that Hluttaw members have a high interest in solid waste separation.

5.3.4. Solid waste management processes

When we surveyed to estimate the average daily solid waste generation per capita in Myanmar in 2025, 3% of Hluttaw members (n=1) guessed the accurate amount of 800-1000 grams, followed by the other 3% (n=1) hitting nearly 600-800 grams (Figure 14). According to the feedback, 64% of members (n=21) responded "unknown" about the estimation of average daily solid waste generation. For Myanmar, it will be still difficult to some extent to guess solid waste generation per capita.

For the query of whether there is unregulated garbage disposal in his or her constituency, 30 Hluttaw members react that there is unregulated garbage disposal in their constituencies as shown in Figure 15 (a). Three members gave feedback that there

is no unregulated garbage disposal in his or her constituency, which is one and two from Yangon and Bago regions respectively. According to the responses, 91 % of townships in Myanmar still dispose of unregulated littering. Among 8 respondents from Bago region, two members answer that there is no unregulated garbage disposal while six reply that there is unregulated garbage disposal in their constituencies. It can be concluded that in the Bago region 75% of townships dispose of unregulated garbage.

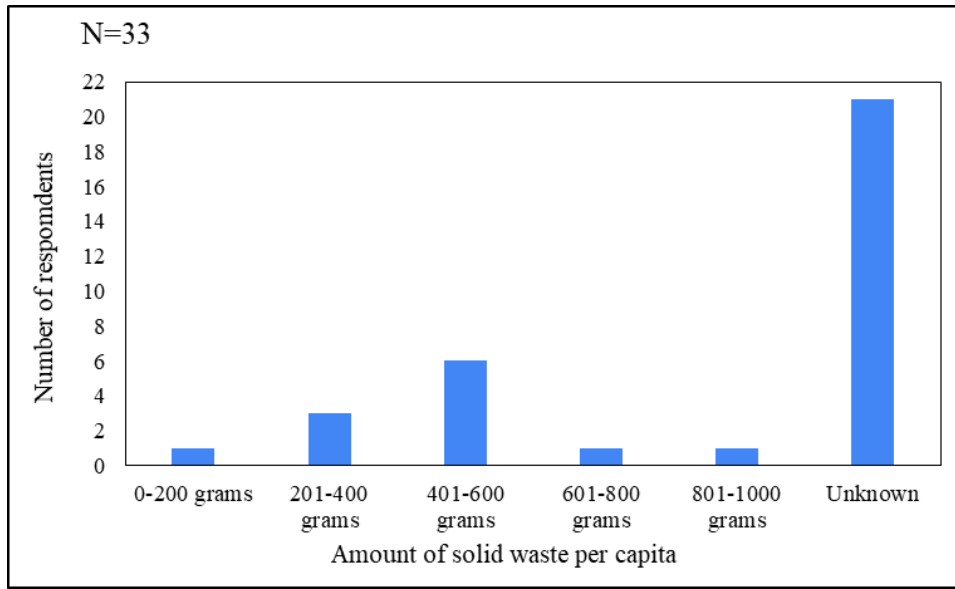


Figure 14. Average solid waste generation per capita per day in Myanmar in 2025.

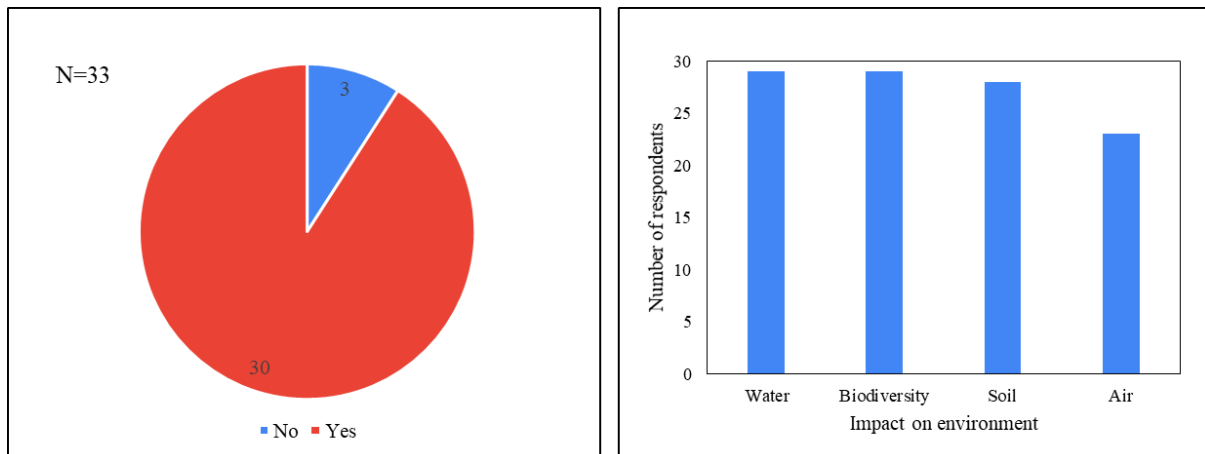


Figure 15. (a) Opinion of respondents on unregulated garbage disposal and (b) its impacts on environment.

Amongst seven members from Yangon region who gave feedback to the survey, one reacted No and six Yes, meaning that almost 86% of townships from Yangon region

dispose of unregulated garbage. All around Myanmar, there are a lot of unregulated garbage disposal.

The consequences of unregulated garbage disposal are impacts on water, biodiversity, soil and air shown in Figure 15 (b). As an adverse effect, when we surveyed the questions about impact on environment due to garbage disposal, most of Hluttaw members commented the impacts go to biodiversity (n=29), soil (n=29), water (n=28) and air (n=23), where n implies number of Hluttaw members.

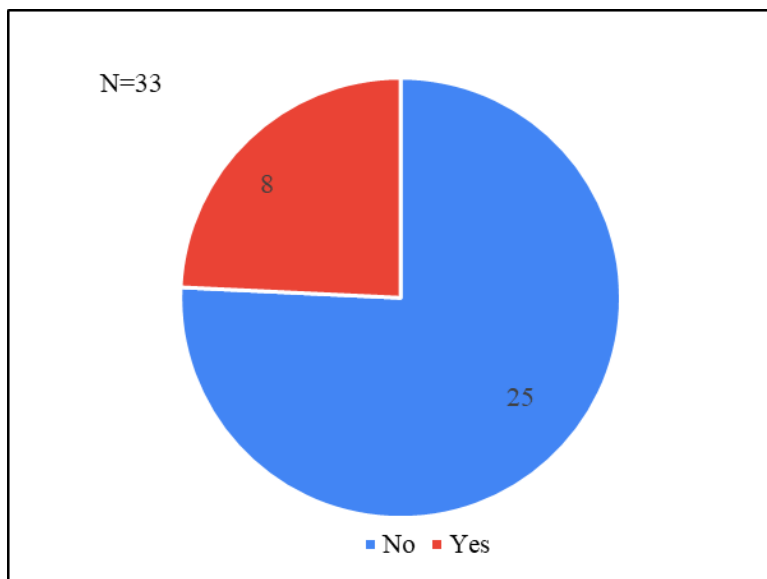


Figure 16. Condition of waste disposal sites in respective constituency.

Regarding disposal sites, in the question of whether the waste disposal sites designated by the municipal committee in his or her constituency are sufficient or not, 25 numbers of constituencies answered “not sufficient” in waste disposal sites while 8 numbers commented “sufficient” as shown in Figure 16. It describes that almost 75% of townships in Myanmar do not have sufficient waste disposal sites. Therefore, it is necessary to prepare sufficiently designated waste disposal sites all around Myanmar. From their feedback, significant reasons to provide designated waste disposal sites are grouped into eight according to solid waste management system.

With respect to the feedback they suggest, the reason why the waste disposal sites are not sufficient is mainly due to scarce landfilling, followed by waste collection.

When we request to express the solid waste management process such as collection, transportation, processing, land filling, 3% of PMs (n=1) know well about solid waste

management process while the other 97% of PMs (n=32) could not reach an answer about solid waste management process. Most of Hluttaw members are weak in the solid waste management process. This can also be due to improper waste management processes in Myanmar that have been used currently and no accurate data on the amount of recyclable solid waste. As from their feedback, it is necessary to provide education programs on solid waste management processes sufficiently to both PMs including the public around Myanmar.

Table 2. Respondents’ significant reasons to provide designated waste disposal sites

Waste management process	No. of respondents
Waste Separation	2
Waste Collection	7
Waste Processing	0
Landfilling	14
Source Reduction	1
Recycling and Composting	0
Resources	
a. Conversion Technologies	2
b. Awareness	1
c. Human Resources	3
d. Budget (Funding)	3
e. Transportation Vehicles	2
Law making and Enforcement	1

In the question to advise which methods they should use when disposing of residential waste, 82% of Hluttaw members (n=27) give advice that they should use waste separation methods when disposing of residential waste on the other hand 9%of

members (n=3) suggested that waste management process, especially emphasizing on waste collection while 3% of members (n=1) pointed to emphasize on 3Rs (reduce, reuse and recycle). Significantly and interestingly the last 3% of members (n=1) suggested starting with awareness to the public. For residential waste disposal for Myanmar, it is necessary to implement the most fundamental action of starting from awareness to the public to emphasize waste collection, 3Rs including the whole residential waste disposal methods.

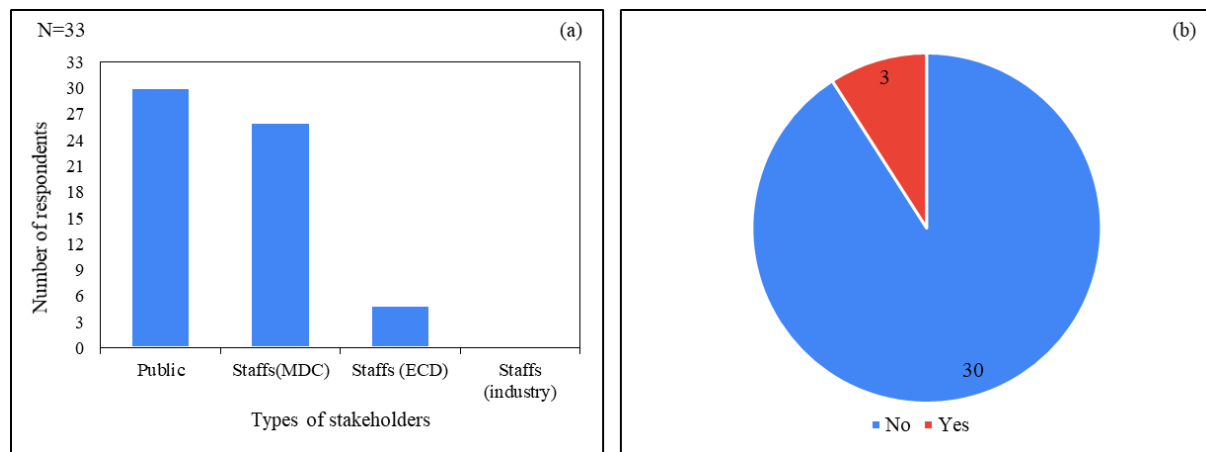


Figure 17. (a) Stakeholders that should be involved in waste management and (b) condition of fund for solid waste management (adequate or not)

In the matter to comment on those who should be involved in waste storage and management, most Hluttaw members suggested those to be involved as “public” (Figure 17 (a)). Furthermore, 79%of members commented as “municipal staff” while 15% of members advised those to be involved as “staffs from the Environmental Conservation Department”.

In assessing whether funds being spent on solid waste management are adequate, 90% of Hluttaw members (n=30) gave feedback uniformly that funds they spent on solid waste management as “not sufficient” as shown in Figure 17(b). According to their answers, Hluttaw members are aware, knowledgeable and attentive of insufficient funds being spent on solid waste management.

In the affair about whether solid waste should be recycled, 76% of Hluttaw members (n=25) suggested recycling and reuse; on the other hand, 6% (n=2) were not willing to recycle, then 15% (n=5) gave their comment as “not sure” (figure 18). It can be known that most of Hluttaw members have right and suitable knowledge about reuse and

recycle activities. According to our findings, we need to input more effort into reuse and recycling daily process to the public, including Hluttaw members.

In the point to assess whether there are any criminal penalties imposed by law regarding solid waste in Myanmar, 8 members, 24% of “No” responses, realize that there is no criminal penalty imposed by law regarding solid waste in Myanmar while 10 members, 30%, answered as “Yes”. 15 members, 45%, responded “Unknown” to show their uncertainty whether there is a criminal penalty by law (Figure 19(a)). Then it can be supposed that 30 % of members who assume that there is a criminal penalty imposed in Myanmar might be confused between prohibition, restriction, disallowance by the municipal committee and criminal penalties imposed by laws. As for Myanmar where criminal penalties are not imposed by law regarding the solid waste, we need to make clear the criminal penalties imposed by law among the public in Myanmar.

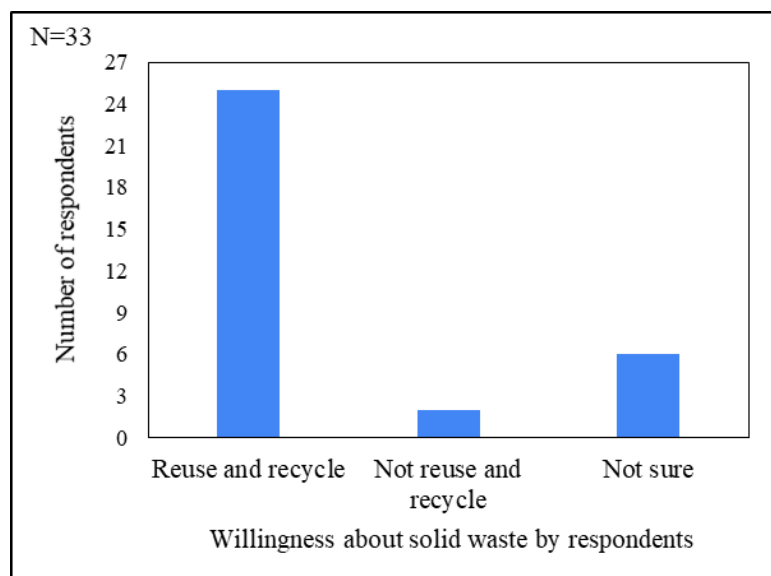


Figure 18. Recommendation of respondents to solid waste reusing and recycling.

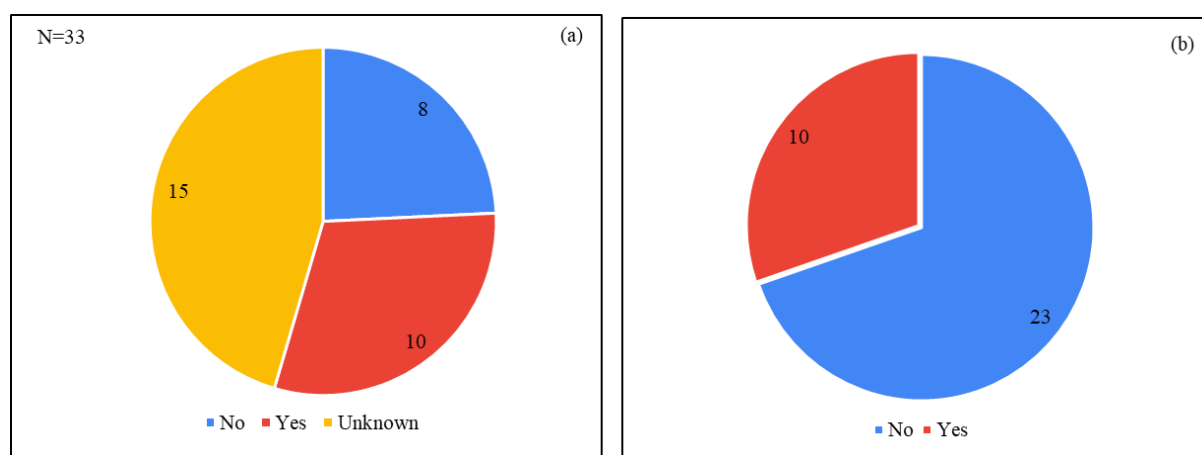


Figure 19. (a) Assumption of respondents on penalties regarding solid waste in Myanmar and (b) having prepared for waste management plans in their respective constituency.

In the issue of whether their constituency has solid waste management plans, ten members which is about 30% of total respondents have and carry out solid waste management plans as shown in Figure 19 (b) and gave reasonable answers about carrying out solid waste management plans in their served terms of parliament. They carry out their management plans by the following ways: to develop private waste collection services, to collect waste as a private enterprise during 2015-2020, to formulate policies and draw up plans for the relevant departments in township meetings, to integrate projects with municipal and community organizations. 23 members, which is about 70 % of the members replied as “No” that means not having solid waste management plans. They advise referring to relevant plans for solid waste management from some developed countries such as Japan, Singapore, Korea, United States, Switzerland, Netherlands and China. From their advice, we can see that Hluttaw members are willing to give and share advice and suggestions about management plans, some even have been taking part in carrying out and implementing management plans.

Among nine questions we asked regarding the solid waste management process, two Hluttaw members obtained up to 15 scores out of 20 with respect to our marking scheme; on the other hand, the lowest score they gained is down to 4. In this matter, 60% of Hluttaw members (20 respondents) are graded with the score below 10 out of 20 at the same time 39% of members (13 respondents) reach the score above 10 out of 20 (in Figure 20). Hluttaw members are willing and thoroughly give feedback and comments for the entire survey and some took part in implementation of solid waste management plan, over half of Hluttaw members obtained over half the total scores. Therefore, we can assume most Hluttaw members are knowledgeable and aware of solid waste management plans.

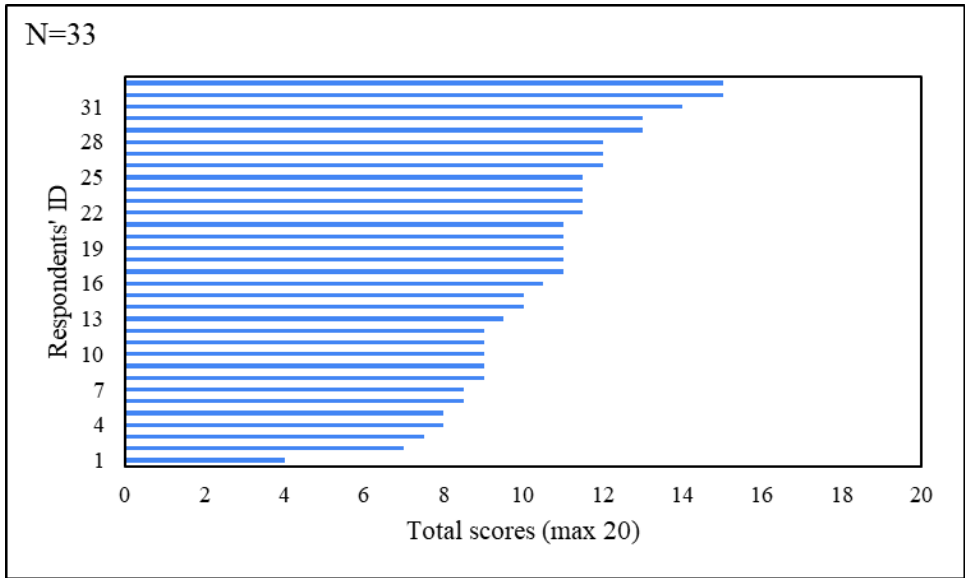


Figure 20. Individual score of respondents in solid waste management

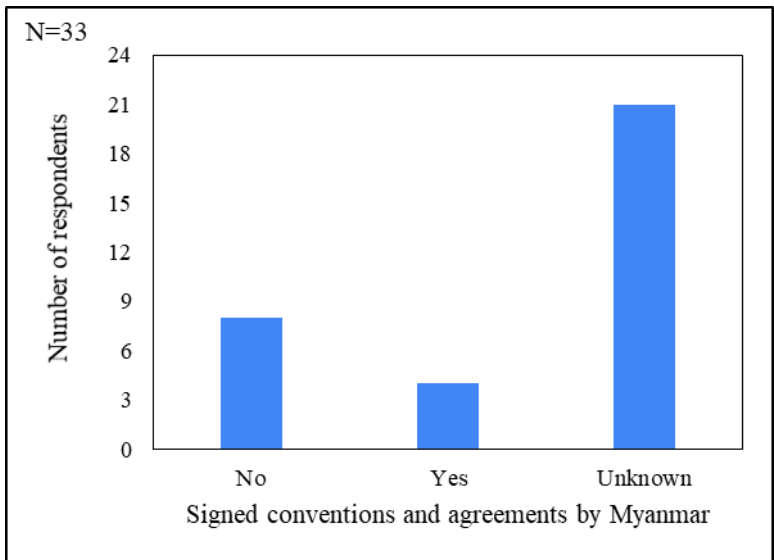


Figure 21. International conventions and agreements related to solid waste signed by Myanmar

In the inquiry of whether there are any international conventions or international agreements related to solid waste that Myanmar has signed, 8 members, 24%, react “No”, which means that there are no international conventions or agreements related to solid waste signed by Myanmar. At the same time 21 members, 64%, hit “Unknown”. Four members, which is about 12% of the respondents, responded “Yes” that there are few international conventions or agreements, Basel Convention and Minamata, which are concerned with solid waste which Myanmar has signed, although they cannot

describe the exact ones (Figure 21). Being unable to describe the exact agreements and conventions exactly may be due to the respective departments not being able to announce which agreements or conventions have been signed and accomplished successfully to all the other departments and personnels.

When we asked for their recommendations to solve the disposal issue (Table 3), public awareness raising is the most influential factor (n=20), followed by law, enforcement and good government (n=15).

Our findings suggest that more effort is crucial in future law making and enforcement to carry out solid waste management. Besides, public awareness is also pivotal, implying that we need to put more effort into providing knowledge sharing and raising public awareness. Since Myanmar is still a developing country and it is still using traditional methods concerned with solid waste, technology needs are also one of key issues according to their recommendations. Therefore, we need to consider those factors to create a more improved Myanmar’s solid waste management in future.

Table 3. Respondents’ recommendation to solve waste disposal issue

Waste management process	No. of respondents
Waste Separation	0
Waste Collection	1
Waste Processing	1
Landfilling	4
Source Reduction	0
Recycling and Composting	0
Resources	
a. Conversion Technologies	5
b. Awareness	20
c. Human Resources	1

d. Budget (Funding)	2
e. Transportation Vehicles	0
Law, Enforcement and Good Government	15

6. CONCLUSION

Waste problems are one of the most significant environmental problems that need to be handled well and paralleled to population and economic growth all around the world. Myanmar, a developing country, cannot manage municipal solid waste due to lack of information and weak legislation about waste. More than 50% of female parliament members had answered the survey, showing that women are more willing to solve the waste problems. As for the education background, the graduate degree is the greatest mode found from results. Most of the respondents showed the strongest interest in environmental conservation. That result showed that the elected Hluttaw members are willing to conserve our homeland to make sure to reach the sustainable development goals. 90% of the respondents had good awareness in the solid waste sector with scores above 23 that is half of the total score. 63.64% of the respondents had good awareness in the general understanding on solid waste with above of half of the total score (9), 93.94% in the solid waste collection sector (max score= 7), 84.85% in the solid waste separation sector (max score= 10) and 54.55% in the solid waste management sector (max score=20) respectively. In relation to these four sectors, the parliament members' awareness in the solid waste collection had the highest mode with the scores above from the half of the total and the lowest in the solid waste management. In addition, there was the weakness in *acknowledging* the international conventions and agreements related to solid waste signed by Myanmar that had been known by only 4 members. In conclusion, most of the respondents had sound interests in environmental conservation and good awareness in the solid waste especially in the collection and the separation sectors.

7. RECOMMENDATIONS

- i. We need to carry out more precisely by collecting better and more specific data and information as for Myanmar where waste information is limited.
- ii. We should also conduct similar surveys to government staff related to waste management (municipal staff, Environmental Conservation Department staff, etc.) to get public opinion about waste management.
- iii. We should provide waste management training to parliament members to improve their knowledge of environmental awareness.
- iv. We should provide workshops for Parliament members on international conventions, agreements and as much as possible.
- v. We should provide an extension programme (such as sharing pamphlets, providing seminars and training) about the waste management process not only to parliament members but also to the public.
- vi. In Myanmar, it should provide training on how to separate and collect waste and let the public comply with suitable rules in line with policy.
- vii. Parliamentarians should propose that environmental protection lessons be included in school lessons since childhood to eradicate stereotypes and increase environmental awareness and love for the environment among young people.
- viii. As Members of Parliament, they should include all their knowledge of environmental protection in holding parliamentary meetings and public meetings and engage in environmental activities with the public as much as possible.
- ix. Members of Parliament should submit proposals in Parliament to obtain human resources and budgets, technology to transform waste disposal systems into energy production systems.
- x. Members of Parliament should study and imitate the good practices and systems of the neighboring countries for waste disposal, and to push for reforms in the country.
- xi. It should be recommended and discussed to provide money, manpower, and technology resources to domestic waste reprocessing industries and small sole proprietorships so that the reprocessing industry can grow economically.
- xii. Future policy about waste should be applied bottom-up procedures not top down in order to be more all-inclusive. Since Myanmar is leading to Federal democracy, the bottom-up approach is more suitable to apply.

REFERENCES

- ADB. (2018). Economic forecasts for Myanmar. Retrieved April 10, 2018, from <https://www.adb.org/countries/myanmar/economy>
- Aung, M. H. (1967). *A History of Burma*. New York and London: Cambridge University Press.
- Bhardwaj, L. K. (2023, September). *Solid Waste Management (SWM) and Its Effect on Environment & Human Health*. India. Retrieved from Reserch Gate: <https://www.researchgate.net/publication/373717054>
- ECD. (2018). *National Waste Management Strategy and Master Plan (2018-2020)*. Nay Pyi Taw: Environmental Conservation Department (ECD), Ministry of the Natural Resources and Environmental Conservation, the Republic Union of Myanmar.
- Guerrero, L., Maas, A., & Hogland, W. (2013). Solid waste management challenges for cities in developing countries. In *Waste management* (pp. 220–232).
- Imam, A. (2008). Solid waste management in Abuja, Nigeria. *Science Direct*, 28(2), 468-472.
- Kollmuss J, Agyeman J. (2002). Mind the gap: why do people act environmentally and what are the barriers to proenvironmental behavior? *Environmental Education*, 8, 239-260.
- Kyaw, M. M. (2019). *Yangon University of Education Research Journal*, 9(1).
- NIOS. (2008). *ENVIRONMENTAL AWARENESS*. India.
- Saat, S. A. (2014). Analyzing the sustainability of solid waste policy in Malaysia using the ecological modernization theory. *Malaysian Journal of Society and Space*, 10(6), 118–125.
- Shin, M. H. (1997). The Frontage of Human Environmental Conservation. In *Yearbook of Myanma Encyclopedía* (p. 57). Yangon: Sarpe Beikman Press.
- UEC. (2010, March 8). Union Election Commission. Retrieved from Wikipedia: https://en.wikipedia.org/wiki/Union_Election_Commission
- UEC. (2020). *2020 General Election in Myanmar- Fact Sheet*. Nay Pyi Taw.
- UNDP. (2019). *Survey of Myanmar Members of Parliament*.
- UNFPA. (2019). *The 2019 Inter-censual Survey*.