



BEYOND WASTE: EXPLORING THE LIVED EXPERIENCES OF GARBAGE COLLECTORS IN CLIMATE CHANGE AND MITIGATION

Charisse B. Felicilda, Allyza A. Tabañag, Angelica G. Lantad, Junaiva R. Lumungsod,
Maricar Louie D. Macaday, Arman P. Nuezca

Science Department, Central Mindanao University, Maramag, Bukidnon, Philippines

ABSTRACT

Solid waste management is crucial for maintaining public health and environmental sustainability. Although numerous studies have examined the impacts of improper solid waste management, there remains a significant gap in understanding the environmental role, health risks, and community interactions of garbage collectors. This study aims to bridge this gap by exploring the lived experiences of garbage collectors concerning climate change and mitigation. Conducted from June to July 2024, the research employed a phenomenological design and semi-structured interviews with three (3) garbage collectors working in barangay Dologon. Data were analyzed thematically using the Colaizzi Method. The study focuses on describing the perceptions, challenges, and practices of these participants in response to climate change. Findings revealed that garbage collectors perceive climate change primarily as a change in seasons and a phenomenon that significantly impacts vegetation. Key challenges identified include handling of decomposable waste, segregation issues, and weather challenges. Despite these challenges, garbage collectors engage in essential practices such as waste collection, enforcement and deterrence, landfill procedures, plastic waste regulation, segregation and recycling, waste management education, and waste packaging and transport. The research contributes to the growing body of knowledge on sustainable waste management and emphasizes the need for their inclusion in policy-making to mitigate climate change and enhance public health.

Keywords: *climate change, climate mitigation, experiences, garbage collectors, perceptions, waste management*

INTRODUCTION

Waste collection is extremely important for society, both in terms of public health and the environment. It is the process of assessing the area's condition by tracking waste volumes to understand the capacity of one's area to handle waste disposal by residents. In the past years, several records have shown how much waste is being disposed of, and the lack of facilities, manpower, and resources for sustainable waste handling were the problems. The Philippines generates an estimated 43,684 tons of garbage daily, including 4,609 tons of plastic waste, but proper disposal facilities are lacking for much of this waste (Kessler & Sarmiento, 2018). Only about 70% of the more than 8,000 tons of garbage produced daily in Metro Manila is actually collected. The remaining waste often ends up polluting streets and local rivers, exacerbating flooding issues. The collected waste is taken to dump sites that can catch fire or contaminate water supplies, and as this waste decomposes, it produces methane, a greenhouse gas 21 times more potent than carbon dioxide, contributing to climate change (World Bank Group, 2012).

These challenges led the Philippines to carry out mandates in order to help mitigate the effects of climate change even before these records emerged. Through the Ecological Solid Waste Management Act of 2000 (RA 9003) in the Philippines, the law adopts a comprehensive and systematic ecological solid waste management program. This program utilizes environmentally sound methods to maximize the utilization of valuable resources and encourage resource conservation and recovery. The law also sets guidelines and targets for solid waste avoidance and volume reduction through source reduction and waste minimization measures, such as composting, recycling, reuse, recovery, and the use of green charcoal processes before collection, treatment, and disposal in appropriate and environmentally sound solid waste management facilities (Ecological Solid Waste Management Act of 2000 (RA 9003), 2021).

Even through these efforts, the Philippines, just like other countries, still faces difficulties in handling their waste. One major challenge faced by the community is urbanization, which increases garbage production. In a study conducted by Toure et al. (2022), there is a relationship between population growth and the production of solid waste in the urban municipality of Gao. The waste has become more cumbersome, and the infrastructure, equipment, and appropriate storage areas are lacking. It becomes a major problem and results in the degradation of soils and waterways. This phenomenon becomes a top priority in every place where the population is increasing. In relation to this, there is a high emphasis on proper waste handling practices, which help mitigate environmental problems. A study conducted by Abubakar et al. (2022) found that inadequate solid waste management (SWM) is linked to poor public health and is a major obstacle to environmental quality and urban sustainability. To overcome this issue, it's essential to engage the community effectively. This can be achieved by promoting positive attitudes through public awareness campaigns across various platforms, including print, electronic, and social media. By encouraging people to refrain from littering and adopt proper waste disposal practices, we can reduce water pollution and improve air quality in cities, ultimately promoting a healthier and more sustainable urban environment.

Consequently, government sectors primarily working in solid waste management perceive how solid waste contributes to the ongoing phenomenon of climate change. According to Pathak et al. (2024), the challenges in municipal solid waste management (MSWM) in combating climate change are mainly due to rapid population growth, a lack of public education, and unclear responsibilities among governments, industries, and communities. A comprehensive approach to MSWM is necessary to protect public health and the environment from the risks of waste accumulation and climate change. It highlights the importance of public awareness in proper waste management, which is primarily led by the solid waste management team, as they are considerably one of the key persons in unlocking how the public perceives and takes action to mitigate climate change.

Several studies also emphasize the need for facilities to cater to uncontrolled garbage coming from households, schools, and other public infrastructure. To achieve effective solid waste management, the local authority can play an important role by providing adequate infrastructure, such as bins and recycling facilities, to enable the segregation and recycling of waste. A collaborative approach is necessary, where both top-down and bottom-up initiatives work together to ensure the success of sustainable waste management. This involves the government providing the necessary resources and support while also engaging with the community and encouraging individual responsibility to drive positive change (Fadhullah et al., 2022). Additionally, in the same study, it also suggests focusing on inculcating community involvement in waste separation, waste reduction, and recycling as a habit.

Effective solid waste management (SWM) is crucial for public health and environmental well-being (Belarmino et al., 2022). Key factors for successful SWM include allocating resources, providing technical support, ensuring good governance, and collaborating to protect the environment and human health. To achieve effective and sustainable SWM, local governments, the private sector, donor agencies, NGOs, residents, and informal waste collectors and scavengers must all play their respective collaborative roles (Adeleke et al., 2021). Although studies have examined the impacts of improper solid waste management, there remains an interrelated challenge to the environmental role of garbage collectors that demands more emphasis. Households rely on the government for garbage collection services (Bernardo, 2008). Waste collectors are responsible for waste collection (Mohammed & Abdul Latif, 2014). Garbage collectors are people primarily involved in the collection, transportation, and segregation of selective garbage. Waste collectors often lack proper protection and face significant health risks due to their direct exposure to waste. Additionally, the poor condition and lack of covering on garbage trucks contribute to environmental pollution and widespread health problems through exhaust fumes and dust generated during waste collection and transportation (Ahmade et al., 2013).

This perspective acknowledges the importance of waste collectors in their interactions with the community, which have a significant impact on their daily lives as citizens who also buy and produce waste in return. Their daily work as garbage collectors influences their perceptions of environmental issues and their views on the community's

role in addressing climate change. This has significance for developing sustainable waste management strategies and policies that consider the experiences and needs of these frontline workers. By examining these interactions, we can explore how environmental factors intersect with the lived experiences of garbage collectors in response to sustainable initiatives that mitigate the effects of climate change. Their insights can inform the design of interventions and support systems that better protect the health and well-being of garbage collectors while also promoting more environmentally responsible waste management practices.

Research Questions

The study was conducted to describe the perceptions, challenges, and practices of garbage collectors at barangay Dologon. Specifically, the study aimed to answer the following questions:

1. What are the perceptions of garbage collectors regarding climate change?
2. What are the challenges of garbage collectors?
3. What practices do they employ in response to climate change?

METHODOLOGY

This section contained the methodology used in the study. It began with the research design, locale of the study, scope and delimitation, participants of the study, sampling procedure, instrumentation, data gathering procedure, and data analysis.

Research Design

To understand the lived experiences of garbage collectors in Dologon regarding climate change and mitigation, the researchers utilized a phenomenological research design. This qualitative approach emphasizes the importance of understanding the lived experiences of the participants. The researchers play a crucial role in capturing how garbage collectors perceive and make sense of their experiences related to climate change. By describing and interpreting these experiences, the study aims to provide a comprehensive view of the participants' perceptions, challenges, and practices. This research seeks to uncover the unique experiences and obstacles faced by garbage collectors, shedding light on their awareness of climate change, their mitigation practices, and the challenges they encounter in their work.

Locale of the Study

The study was conducted in Dologon, a barangay in Bukidnon, Philippines. This research focuses on garbage collectors who work in the barangay of Dologon, who play a crucial role in maintaining community cleanliness by gathering and disposing of waste. Dologon, known for its agricultural activities and vibrant community, faces significant challenges related to climate change and sustainable waste management. The barangay of Dologon was governed by eleven (11) key officials: one (1) barangay captain, seven

(7) barangay councilors, one (1) barangay secretary, and one (1) barangay treasurer. In addition, it is important to note that this study exclusively focuses on the garbage collectors currently working within the jurisdiction of Dologon.

Scope and Delimitation

The study focuses on determining the lived experiences of garbage collectors regarding climate change and mitigation. This study was conducted within the vicinity of Dologon Barangay Hall, situated in Dologon, Maramag, Bukidnon, within the months of June to July in the year 2024. The participants were garbage collectors working within barangay Dologon's jurisdiction. Out of the ten (10) garbage collectors, three (3) were selected for interviews to share their perceptions, challenges, and practices related to climate change and mitigation. The selection was made using purposive sampling.

The findings of this study might be context-specific to Dologon and might not be generalizable to garbage collectors in other regions or barangays. The study used a phenomenological design to capture the lived experiences of these garbage collectors. Furthermore, the study does not cover the viewpoints of other stakeholders involved in waste management.

Participants of the Study

The individuals who participated in this study were the garbage collectors working in Dologon. Each participant was chosen based on their extensive experience and knowledge of waste management practices within the community. Their insights and perspectives were crucial in understanding the challenges and successes of garbage collection efforts in the barangay. Through interviews, the study aimed to highlight their perspectives on climate change, exploring both the challenges they encounter and the practices they employ to mitigate its impact.

Sampling Procedures

This study was conducted among the garbage collectors in barangay Dologon, Maramag, Bukidnon, with a specific focus on their perceptions, challenges, and practices related to climate change and mitigation. The researchers utilized a purposive sampling technique, seeking out garbage collectors who had significant experience and insights related to their work and environmental challenges.

Three (3) respondents were selected from the garbage collector population in barangay Dologon. These individuals were chosen for their unique lived experiences and practices related to climate change and waste management. Each respondent provided informed consent prior to participation.

The data collection process involved conducting face-to-face, semi-structured interviews, scheduled at times and locations convenient for the respondents. The interviews centered on the respondents' perceptions of climate change, the challenges

they face, and the practices they employ in response to climate change. With the respondents' consent, their responses were recorded for accuracy.

To ensure transparency and gather more comprehensive data, follow-up questions were asked during the interviews. Once all responses were collected, the researchers transcribed and coded the data, preparing it for further analysis. This method allowed for an in-depth exploration of the unique experiences and practices of garbage collectors in Dologon regarding climate change and mitigation.

Instrumentation

To describe the lived experiences of garbage collectors in climate change and mitigation, a semi-structured interview guide with three (3) primary questions had been developed. This opened opportunities for the researchers to further explore particular themes or responses. The primary questions guided the conversation, and the responses determined the follow-up questions, enabling a more thorough and organized examination of the participants' perceptions and practices.

The data collection was carried out using a human instrument approach, with all participants' responses recorded through audio recordings. This approach ensured a comprehensive and authentic capture of the participants' perception, challenges, and practices, providing rich qualitative data for analysis.

Data Gathering Procedure

The study followed the correct procedures to achieve the following objectives. Before the actual collection of data, the researchers present a letter of approval to the subject adviser, faculty of the Department of Sciences, College of Education, addressing that the research study will be held at the barangay hall in Dologon, Maramag, Bukidnon. After acquiring permission to conduct the study, the researchers distributed consents for the participants in the research study. The participants could refuse to participate or discontinue at any time. The participants were told the purpose of the study, reminding them that it would happen through an interview and that it would take more or less 30 minutes of their time. Additionally, the researchers thoroughly considered the Data Privacy Act of 2012, which adheres to protecting the personal information of the person undergoing the interview.

Data Analysis

During the interviews, the participants were asked questions that encouraged them to recall their experiences as garbage collectors in Dologon. For analyzing and interpreting the data, thematic analysis was conducted using the Colaizzi method. The process began with researchers obtaining a general sense of the transcript by reading it three (3) times to grasp the participants' emotions and mental processes. The researchers then extract significant phrases and statements from the transcript to form the whole

meaning of the experience. The statements were encoded separately for each participant and coded as a transcript page and line number.

Next, the researchers then formulated meanings from the derived significant statements, which were then coded and categorized. These formulated meanings were arranged into clusters of themes, which were further broken down into emergent themes. The researchers then integrate all the resulting ideas into an exhaustive description of the phenomena, which was achieved by combining all the theme clusters, emergent themes, and formulated meanings into a description to create an overall structure.

Finally, the findings were refined to eliminate repetitions and provide a clear and concise description of the perceptions and practices of garbage collectors. This process ensured a comprehensive understanding of the participants' experiences and insights regarding climate change and mitigation.

RESULTS

This section presents the results and discussion of the data gathered from the responses of three (3) garbage collectors in Barangay Dologon, Maramag, Bukidnon. The responses were obtained through face-to-face, semi-structured interviews focusing on their perceptions of climate change, the challenges they encounter in their work, and the practices they employ in relation to climate change mitigation and solid waste management. The Colaizzi method of thematic analysis was utilized to analyze and interpret the participants' responses.

To ensure confidentiality and protect the participants' identities, pseudonyms were assigned, identified as Participant A, Participant B, and Participant C. The researchers repeatedly reviewed the interview transcripts to become familiar with the participants' lived experiences. Significant statements were extracted from the transcripts, and meanings were formulated from these statements. Through careful analysis, twelve (12) themes emerged from the participants' responses. These themes are: seasonal shift, vegetation impact, handling decomposable waste, segregation issues, weather challenges, waste collection, enforcement and deterrence, landfill procedures, plastic waste regulation, segregation and recycling, waste management education, and waste packaging and transport. Their responses were consolidated, analyzed, and are presented in the succeeding figures and discussions.

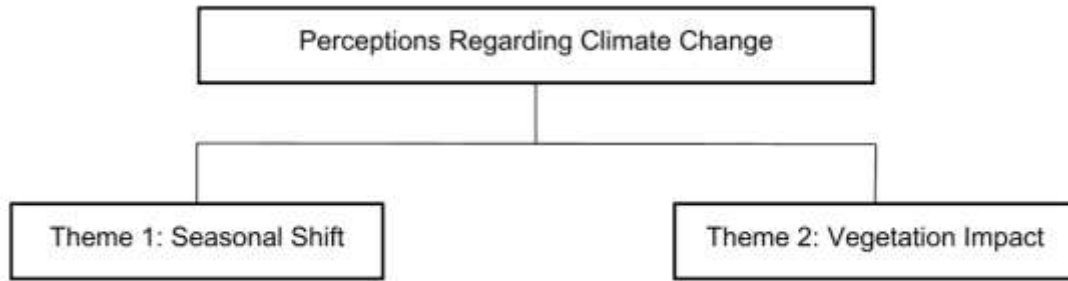


Figure 1. Perceptions of Garbage Collectors Regarding Climate Change

Figure 1 above shows the perceptions of garbage collectors working in Dologon in relation to climate change. The majority of participants viewed climate change as causing shifts in seasons and impacting vegetation.

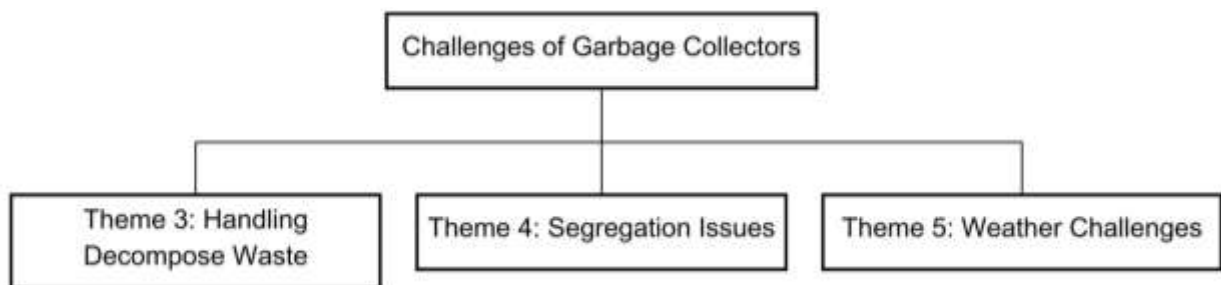


Figure 2. Challenges of Garbage Collectors

Figure 2 illustrates the challenges faced by garbage collectors in Dologon, including the handling of decomposable waste, segregation issues, and weather-related difficulties.

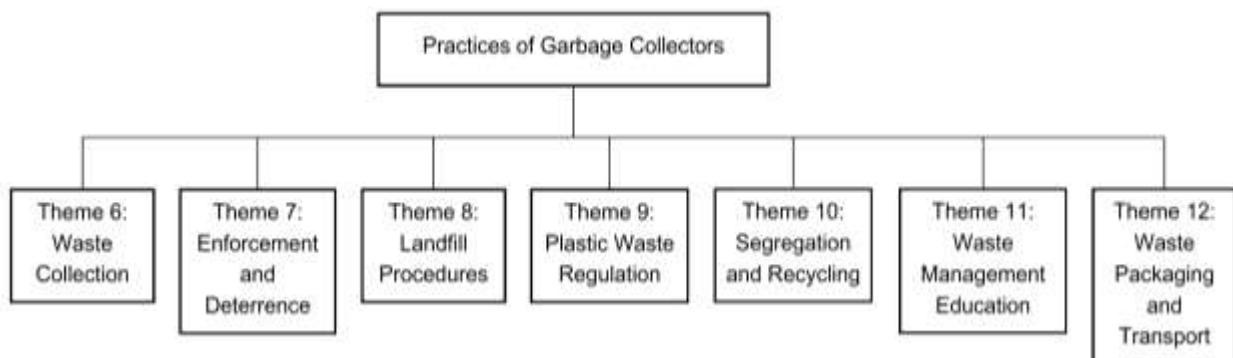


Figure 3. Practices of Garbage Collectors

Figure 3 shows the practices of garbage collectors working in Dologon. These practices include waste collection, enforcement and deterrence, landfill procedures, plastic waste regulation, segregation and recycling, waste management education, and waste packaging and transport.

DISCUSSION

Perception of Garbage Collectors in Dologon Regarding Climate Change

Based on the data gathered, the participants perceived climate change through noticeable changes in weather patterns and their effects on the surrounding environment. Their responses revealed that climate change is primarily associated with shifts in seasonal conditions and changes in vegetation.

Theme 1 - Seasonal Shift

Climate change pertains to the unusual changes of the average condition of the region, such as temperature and precipitation, over a long period. Participant C perceived climate change through observing changes in weather. He noted a shift from previously hot weather to more frequent rainfall, stating:

“Nag bag-o man gud kay katong niagi init dayun ulan na man pud halos. (It has changed because it used to be hot, but now it almost always rains.)”

The participant observation highlights a shift from consistently hot weather to a new pattern of frequent rain, reflecting his personal understanding of climate change based on observed changes in weather over time. A study conducted by Capstick and Pidgeon (2014) found out that many individuals interpret shifts in weather patterns, such as increased rainfall or colder winters, as indicators of climate change. This perception is influenced by direct experiences with changing weather, which reinforces their understanding of climate change as a tangible phenomenon affecting their everyday lives.

Theme 2 - Vegetation Impact

Climate change significantly impacts vegetation in various ways. Warmer temperatures can extend growing seasons but also stress plants during extreme heat. Altered precipitation patterns lead to droughts that reduce water availability, while excessive rainfall can cause root rot. Participant A shares his perception of climate change, viewing it as a change in the barangay where he lives. He observed:

“Kanang kuan... kanang pareha ana karon... og sa amoa lang... sa akua lang nga pag sabot kay naa man mi sa garbage. Murag... oh ...naa man... collector. So, murag makita pud namo nga murag kanang, naay kabag-ohan sa

among... kanang sa barangay... ing-ana ba. (You know, like right now... in my own understanding... in my understanding, since we are in garbage collection... it's like, yes, as collectors, we can see that there are changes in our barangay... something like that.)"

When asked to elaborate on the changes in his barangay, Participant A explained that gardening during the dry season used to be challenging because plants would die. However, with the rainy season now occurring during this period, gardening has become easier and more advantageous. He elaborated:

"Kay og... og karon, mas... bintaha nga ginhawa-ginhawa naman ta ron kay pwedi ta na maka garden, pwedi na ta maka kuan. Kay sa una, mag garden ta mamatay man gyud... murag ing-ana ba. Murag naay... dako na puy kausaban ang... nga na kuan... nga tung niagi, ting-init, niya karon ting-ulan na. Murag ing-ana ba nga kuan. (Because now, it's more... advantageous for us since we can garden now, we can do things. In the past, when we gardened, the plants would die... it's like that. It seems there has been a big change because before, it was the dry season, but now it's the rainy season. It's something like that.)"

Similarly, Participant B described that the area is much cooler these days compared to the past few months, which is also associated with weather that is more favorable for plant growth. He stated:

"Ah, karon murag bugnaw na gyud ron, karon panahuna, tungod kay sige'g ulan-ulan, unya nagkaanam pud ug kadaghan ang mga sagbot karon, sa atoang lugar karon (referring to the current situation of the area), nanubo sa sige'g ulan-ulan (Ah, it feels quite cold now during this time because it keeps raining, and the weeds have also grown more in our place now due to the constant rain.)"

Participant C also associates climate change with the changing seasons, where during the dry season, the grass dies due to high temperatures. During the rainy season, the grass grows back to life. He shared:

"Ah, napamatikdan jud kay grabe man ang pag kuan gyud, sa kuan manguan man... ang mga sagbot mangamatay, dako kaayo ang kuan, karong ulan namangon na pud balik. (Ah, it's really noticeable because the [heat] has been intense, you know, the weeds were

dying off, but now with the rain, they are growing back again.)”

The participants' experiences underscore the significant changes in local weather patterns due to climate change, making activities such as gardening more feasible and beneficial during times that were previously unfavorable. This aligns with findings from Reyes-García et al. (2024), highlighting rural communities' perceptions of climate change impacts on agriculture and weather patterns.

Challenges of Garbage Collectors in Dologon

The participants' responses revealed that garbage collectors encounter various challenges that affect the efficiency and safety of their daily work. These challenges primarily involve handling decomposing waste, managing improperly segregated garbage, and working under unpredictable weather conditions.

Theme 3 - Handling Decompose Waste

One significant challenge for garbage collectors is handling old, unpleasant, and hazardous waste piles. The foul odors, unsanitary conditions, physical handling difficulties, safety hazards, and increased workload from decomposing waste negatively impact their working conditions and efficiency. Participant A shared his experiences:

“Number one gyud, number one gyud nga kanang ma kuan namo ma engkwentro namo... pareha anang mangolekta mi, mangolekta mi niya kanang mu ingon nga dili ilabay kay gamay ra kay... actually naa man gyud bayad ang... mulabay ka'g basura. Diri singkwenta, dayun... mao na nga ang uban og kuha namo nga kanang... dili pa nila ihatag kay gamay pa niya pag sunod namo kuha daghan na iyang basura niya nagabok na iyang gisudlan kay nadugay na man. So, mao nay maka pungot samoa niya naa pagyud na'y mga ulod. Makaligo biya mi'g mga ulod kay anang mga ing-ana kay... amo biya nang e-itsa niya habog kaayu among... among... dump truck. Habog mana, niya og ma gabok na siya, so inig labay ma bungkag diri gyud na sa amoa tanan. Maligo gyud mi og kanang basura. (One of which we encountered, just like when we're collecting... is that some residents tell us not to collect their waste because it's too small yet (for them)... because to tell you there is a fee for every collection. Here it's 50-pesos, that's why some people are telling us not to collect it because their waste is too small yet, so when we return again for the next rounds, we collect a lot of wastes, so the sacks become old, weak and brittle. That really upsets us, and some of it has worms too. Our dump truck is a bit high, so one way that we can dump them is to throw it up. When

we are throwing the wastes, the sacks are weak and brittle easily so we sometimes experience having worms or wastes falling directly to us.)”

The participant's experience highlighted how the 50-peso fee, intended to encourage proper waste disposal, has the unintended consequence of leading to the accumulation of decomposing waste, which in return creates difficulties for garbage collection. A study conducted by Petryk et al. (2019), higher fees for municipal waste collection and management are associated with an increase in the percentage of selectively collected waste, as the higher fees creates a financial incentive for residents to sort and recycle more of their waste. Similarly, this causes residents to accumulate more of their wastes before giving it to garbage collectors. Regarding this, Gutberlet and Uddin (2017) argued in their study that household waste not only contains hazardous materials and toxic substances but also poses health risks during collection, separation, and transportation. Vulnerable groups, including waste pickers, municipal and private waste collectors, and small waste traders, face these hazards directly. Moreover, residents may also be affected.

Theme 4 - Segregation Issues

Proper segregation of waste is a crucial aspect of effective garbage collection, yet it remains a persistent challenge for garbage collectors. Participant B shared his experiences and how his team handles this situation:

“O, ana gyud, o (when asked if he felt upset when the garbage was not segregated properly). Pero gina segregate namo amoa daan diha (before dumping in the landfill). Sa pagkuha namo kay naa may murag bodega diha sa MRF lahi ang lata, plastic, botelya. (Yes, it's like that. But initially, before dumping in the landfill, we segregate the garbage that we collected here in our warehouse which is the MRF, separating cans, plastics, and bottles.)”

Despite the frustration of dealing with individuals who fail to segregate their waste, Participant B shared that he and his team remain steadfast in their commitment to ensuring all waste is properly sorted at the Materials Recovery Facility (MRF).

In relation to the segregation issues, Participant C shared that despite their efforts to identify and exclude improperly mixed waste, it would still occasionally get through the collection process. He explained:

“Ug di mi ka... naa man jud usahay na dili jud namo mabantayan na mix kay karga... nga karga lang biya ka niya naa juy isa na ma miss, maapil jud siya pero makita namo na, dili jud. (There are times that we missed to notice

it, since we are busy loading the garbage. However, if anyone saw, we really don't include it.)"

Participant C also highlighted the inconsistency in waste segregation behavior, particularly concerning the use of designated containers or sacks for different waste types, which poses a significant challenge for them. He shared:

"Naa... naa... naa Ma'am, kay kana man pud ilang mga basura kay naay kulungan dili parehas sa uban na naa gyuy ngalan na malata dili malata, pero naa gyuy uban na dili mutuman sa kuan [balaod], dili parehas sa uban tawo na musulti man jud. (There is, Ma'am, because unlike others who label their sacks with 'Biodegradable' and 'Non-biodegradable', some use metal cages for their garbage. Thus, we cannot follow the rules consistently, but there are still other people who make us aware.)"

While many residents comply with the guidelines and properly segregate their biodegradable and nonbiodegradable waste, there remains a persistent group of individuals who disregard these practices. This inconsistency in waste segregation behavior poses a challenge for the garbage collectors, who must navigate those mixed streams and ensure proper disposal, even as they strive to maintain the segregation standards. These findings align with the findings in the study conducted by Moeini et al. (2023) which highlights waste segregation at the source is important for effective urban waste management. Proper separation of waste reduces environmental hazards, conserves resources, and prevents pollution. It also emphasizes the need for multifaceted interventions, including education, facilities, and community engagement, to promote sustainable waste separation behavior in households.

Theme 5 - Weather Challenges

The unpredictable weather patterns, ranging from intense heat during the dry season to heavy downpours in the rainy season, pose significant challenges for garbage collectors. Despite these conditions, they must maintain reliable waste management services for the community. Participant A shared his experience:

"Pag-init na, atu man tung na-agian gyud nga init. Amo ra gihapon tung nga... gi agwanta. Nga kuan... nga ing-ana nga sistema, dayon... karon nga ni balik na pung ulan-ulan, kami, ga... tuyok man gyapon mi... bisag asa diri nga ga kuan kay... tanan man purok diri lang sa Dologon walay labot ang CMU. Ga kuhaan gyud mi, ga collect gyud mi aning... garbage. (When the dry season comes, we all experience it, but we just endure that kind of system. Now, that the rainy season began, we still roam around Dologon area to collect garbage but, CMU is not included.)"

Similarly, Participant C shared how difficult it is to face the changes in weather patterns, despite this, his job is still the priority. He shared:

“Dako kaayo nga kuan gyud uy... sa kung init kay di man jud ka katrabaho na dili ka mabulad og init og ulan pud dili pud ka kabwelo og trabaho kay mabasa man ka. Ma kuan [likay] jud ka kay init og ulan imong kuan [kalaban], lisod man pud mo kuan [mutrabaho] ka pirmi og kuan [ting-ulan og ting-init] kay ikaw man maapektuhan ana. (It is really hard to work in hot weather. If it is raining, it is also difficult to work because you will get soaked. You are constantly affected by the heat and rain, making it tough to do your job.)”

The weather-related challenges disrupt their operations and hinder their ability to effectively perform their duties, which forces the need for adaptability and resilience in the face of the changing climate. The dedication of participants to work, despite these challenges, emphasizes different types of difficulties they must navigate to maintain proper waste management. Similarly, in the study conducted by Hussain (2020) found that North Nazimabad, Block I (NNBI) faces several challenges related to weather and waste collection. These include extreme weather events affecting waste handling, inadequate infrastructure during heavy rains, and difficulties faced by garbage collectors in maintaining efficient waste disposal systems, thus, there is a need for better weather-resilient waste management practices to address these issues.

Practices of Garbage Collectors in Dologon

Based on the responses gathered from the participants, garbage collectors carry out several waste management practices that contribute to maintaining cleanliness and protecting the environment. These practices encompass waste collection, enforcement and deterrence, landfill procedures, plastic waste regulation, segregation and recycling, waste management education, and waste packaging and transport.

Theme 6 - Waste Collection

Waste collection is essential to prevent environmental pollution and ensure public health, safety, and environmental quality. Proper solid-waste collection is crucial, particularly since garbage disposal remains a significant issue. Participant B shared his experience with household garbage collection and his practices when encountering litter on streets and highways. He stated:

“Ana gyud kolektahon gyud, pang kwaon gyud ang mga basura. Bisag kami, amo gyud nang kwaon ang mga basura. Kay lain man sad kaayu tan-awon nimo ug sige kag agi unya daghan kaayug basura. (Yes, it is collected, even us we collect the garbage in streets because it is so

awkward to see garbage everywhere when we roam in the area.)”

Similarly, Participant C outlined their specific practices and policies regarding waste collection, particularly excluding yard waste such as grass or soil placed in sacks from their service:

“Basta kanang mga sagbot dili na namo kuhaon, mga sagbot na isulod sa sako kay dili na namo kuhaon, kanang mga yuta na isulod sa sako na e-apil og labay kay dili na namo kuhaon. (We do not collect yard waste, such as grass or soil in sacks. These types of waste are not part of our collection service.)”

Waste collection as a practice of garbage collectors in Dologon is a vital community service that ensures the cleanliness, health, and well-being of their neighborhood. These dedicated individuals play a crucial role in maintaining environmental hygiene by systematically gathering refuse from homes and public areas. A study of Nathanson (2024) stated that maintaining the environment's quality, safety, and public health depends on proper solid-waste collection and it is a labor-intensive process that makes up around 75% of the overall cost of solid waste management.

Theme 7 - Enforcement and Deterrence

Enforcing proper waste disposal poses a significant challenge for garbage collectors, particularly because they cannot always ensure that their neighbors will heed their teachings and practices. Moreover, preventing littering remains a persistent issue, as they continue to encounter garbage on highways and roads. Participant C illustrated the seriousness of this issue, particularly regarding littering on the highway leading to BUSCO road. He emphasized:

“O, isa gyud na, labi na tong mag labay na diha lang sa highway, amo gyud na labi na kanang padulong sa BUSCO na dalan, kung naay ilabay dira na basura na nag katag, tan-awon jud na namo kung naa ba nay resibo, o naa bay mga kuan kay mao na among kuanan na iyaha jud ni gikan kay kung aha gikan ni nga basura mahibal an nimo kung kay kinsa gud ni siya. Mao nang pang ukayon namo kay aron mapatawag na dayon diri sa barangay og mahibal-an na mao ni iya ngalan. Kay aron mahilbal-an ba kung ika pila na siya nag labay, mao na among kuan diri. (Yes, it's one thing especially for those who throw garbage on the highway, especially the one that leads to BUSCO road. If we see that there is garbage, it's littered, we'll see if there are receipts to ensure that the garbage is from that person. That's why we thoroughly inspect the garbage we collect to

know who is accountable for it and it will be invited to the barangay.)”

Even though there are rules and regulations on proper waste disposal, there are still individuals who throw their garbage on the streets and roads. In order to keep our environment clean and the population healthy, effective enforcement measures are required, such as fines and penalties for illegal dumping. Deterrence tactics, like public education and awareness campaigns, are essential for curbing littering and promoting proper disposal of waste among individuals. A study by Almer and Goeschl (2010) has shown that enforcement intensity has a deterrent effect on the amount of waste crime, indicating the importance of enforcement in preventing illegal waste disposal. As the participants said, they are looking for clues whenever they pick up trash on the roads so that they will be penalized.

Theme 8 - Landfill Procedures

Landfills are important and it is created to manage waste collected in a particular area to minimize any health and environmental issue. Throughout the processes of collection, transportation, disposal, covering, and monitoring, landfills are carefully managed to ensure safety and prevent contamination. Participant C shared insights into the disposal process of collected waste. He explained:

“Ah, didto sa kuan, ay wala na Ma'am kay gina ukay man gud na siya'g backhoe didto kay ang gikan diri sa amoa kuhaon og depende sa nag segregate, kay og abot na dadto kay sagol naman gud tanan, dili na ma kuan ba kay anaon pud nag backhoe dadto kay pangkuanon man na na mahuho dayon tabunan og yuta. (Ah, at the [landfill site], Ma'am, after collection, it undergoes sorting with a backhoe. Depending on how it was segregated, once it arrives, everything is combined because it cannot be segregated anymore. The backhoe then covers it with soil to bury it.)”

The statement shared by the participant highlights the practical challenges in waste segregation and the role of heavy machinery in managing landfill operations. Landfills are designed to contain waste and reduce the risk of leachate and methane emissions, which can cause significant environmental harm if not properly managed. According to a study by Brunner and Fellner (2007), properly designed and managed landfills play a significant role in reducing environmental impacts by preventing groundwater contamination and controlling greenhouse gas emissions.

Theme 9 - Plastic Waste Regulation

The adherence to the regulation of burning plastics is often practiced in barangay Dologon, demonstrating a commitment to environmental responsibility. For Participant A,

adhering to the plastic waste regulation is important as it is a legal requirement that must be followed. He shared:

“Niya pagka kuan... dili pud pwedi gani mi... diri sa kuan bawal gali ang sunog diri. Kanang sunog nga mga plastik, o. Bawal gyud na diri sa barangay Dologon. Ah, kay kuan ra gihapon na nag sunod ra mi sa..management gihapon na gikan Maramag. (We are really not allowed to burn plastics here in our barangay. We applied that cause we need to abide rules from the municipality of Maramag.)”

The Philippines has enacted two key pieces of legislation that regulate waste management practices in the country. The Clean Air Act of 1999 (Republic Act 8749) includes a ban on the incineration of waste and the Ecological Solid Waste Management Act of 2001 (Republic Act 9003), which establishes the legal framework for the country's waste management, waste prevention, and recycling efforts (Republic of the Philippines, 2001). Regarding this regulation, Participant A mentioned that they only burn waste for significant purposes, such as producing minimal smoke to avoid mosquitoes. He shared:

“Bawal gyud mag sunog. Kay kung naa ba gali ingon tag mag sunog, mura rag kanang isulod nimog kanang... kaldero or kanang murag kaang raba nga paaso para sa lamok ra bitaw niya alas kuwatro ra pud sa hapon. (Burning of plastics is really not allowed. If we are going to burn something (he did not state what type of material is burned) that's only for the purpose of killing the mosquitoes, and we occasionally do that at 4 o'clock in the afternoon.)”

Minimizing the need for burning is a way to achieve sustainable waste management. Despite the concerns about its effects on the environment, the needs and its benefits were always the priority. In the Philippines, the common practice of "siga" involves morning and/or afternoon yard cleaning, where the swept-up leaves and litter are burned. This burning is seen as an effective way to manage yard waste, but it also serves a secondary purpose of natural fumigation, as the smoke helps to keep mosquitoes and other pests away from the area (Pathak et al., 2023). Although the primary intention of open burning may be to control mosquitoes and pests, it is essential to acknowledge that the practice, regardless of the type of material being burned, including organic substances, still has a detrimental impact on both human health and the environment. The practice of open burning releases hazardous chemicals and particulate matter into the atmosphere, posing adverse effects on both human health and the environment. The specific pollutants emitted vary depending on the type of material being burned. For instance, the combustion of vegetation and organic substances yields toxic gasses such as carbon monoxide, carbon dioxide, and other greenhouse gasses, as well as nitrogen oxides, hydrocarbons, and particulate matter small enough to be inhaled and potentially harm the respiratory system (Indiana Department of Environmental Management, 2022).

Theme 10 - Segregation and Recycling

Waste segregation is a critical process of sorting and separating waste at its source into distinct categories, such as recyclables, biodegradables, and others, to facilitate efficient recycling and proper disposal. Despite its importance, waste segregation poses significant challenges for garbage collectors. However, they diligently engage in recycling and segregation efforts. Participant C emphasized the necessity of adhering to these practices, citing municipal directives mandating waste reduction. He explained:

“Naa, kanang sa amo diha, ang pagrecycle sa kuan kay ang botelya ilahi, ang malata ilahi. Lahi ang mga cellophane og lahi pud nang mga dahon dahon. Kay kanang mga dahon dahon og kanang sagbot nga inun-ana na isulod sa sako ihatod dadto sa MRF. (There is, at our place, recycling involves separating bottles, biodegradables, cellophanes, and leaves into different categories. The leaves and similar organic waste are collected in sacks and are delivered to the MRF).”

Participant B, drawing from his experience as a garbage collector, emphasized the significance of these practices. When asked if he personally engages in recycling and segregation, he replied:

“Pernaminte jud na Ma'am kay naa gud mi sa kuan na lisod man pud na kami gapangolekta na dayon dili namo buhaton, kuan kaayo... (We do it always, Ma'am, because we are garbage collectors and if don't do it, it doesn't feel right...)”

Proper waste handling begins with the individuals responsible for waste collection, as their adherence to appropriate waste management practices contributes significantly to the effectiveness of the entire solid waste management system. Incorporating proper waste segregation and handling into daily operations supports sustainable environmental practices and encourages resource conservation. Effective source segregation reduces the volume of waste requiring collection, transportation, and final disposal, thereby improving the efficiency of waste management operations. Armijo de Vega et al. (2008) demonstrated that a substantial proportion of solid waste generated in their study was recyclable, indicating the significant potential of waste segregation and recycling initiatives. Similarly, Mancini et al. (2007) reported that municipal solid waste contains a high proportion of recoverable materials, highlighting the benefits of implementing effective recycling and resource recovery programs. Building on these findings, Kihila et al. (2021) emphasized that well-planned waste reuse, recycling, and resource recovery (RRR) systems can substantially reduce the volume of waste requiring final disposal while generating economic benefits and contributing to the protection of public health and the environment.

Theme 11 - Waste Management Education

Waste Management Education involves teaching individuals and communities how to handle waste responsibly, focusing on reducing, reusing, and recycling. It aims to raise awareness about the environmental and health impacts of improper waste disposal and promotes sustainable practices for a cleaner environment. Participants A, B, and C highlight the importance of recycling, educating others on proper waste management, and adhering to environmental regulations, reflecting the core principles of waste management education.

Participant A emphasizes the importance of recycling, noting it as a daily routine due to their knowledge and experience. They educate households on effective waste management and adhere to Maramag municipality directives. He mentioned that initially, waste collection didn't use sacks, especially for biodegradable waste, but as the garbage pit filled up, the practice changed to include sacks, showing adaptability to evolving conditions. Participant A shared:

“Ga recycle kay... syempre, natural kay... lisod pud kaayu di ka mag recycle nga ikaw may nakahibalo (laugh). Ikaw may nakahibalo, mas kami pay musulti diha sa mga balay nga ing-anion ni ninyu ha, ang atong basura. (Of course, we recycle because it's natural for us to do so. It would be very difficult not to recycle when you know better (laugh). Since we know better, we even tell people in their homes how to properly manage their waste.)”

Additionally, Participant A also discussed using biodegradable waste as fertilizer, reducing waste while supporting sustainable practices, and stressed the prohibition of burning plastic in Barangay Dologon to promote a healthier environment. He added:

“O, kay kana siya pwedi mana nimo nga ibutang ra sa mga punoan sa kahoy, kana malata kay... naa ba sa... kanang garden nimo inig kalata ana kuan mana siya abuno mana siya. Fertilizer niya, mao nay... kuan mao na kami og mukuha mi nga naay ing-ana malata amo na ignon nga diha rana itapok sa kanang sa kuan sa kahoy kay kana inig kalata ana abuno mana siya. Niya pagka kuan.. dili pud pwedi gani mi... diri sa kuan bawal gali ang sunog diri. Kanang sunog nga mga plastik, o. Bawal gyud na diri sa barangay Dologon. Ah, kay kuan ra gihapon na nag sunod ra mi sa... management gihapon na gikan Maramag. (Oh, those can be placed under the trees, those rotten ones. Those plants in your garden, when discarded, can be turned into fertilizer. When we collect garbage that has rot, we tell them to put them under the trees because when discarded, they become fertilizer. Because, if they're rotten,

we can't put them... here in the dump, burning is not allowed here. Burning plastic, oh. It's really not allowed here in Barangay Dologon. Ah, we still follow... management advised that comes from Maramag.)"

Participant B underscores the need for waste segregation and cleanliness at home and work. They stress educating young people on proper waste management to minimize health risks, indicating a comprehensive approach to waste management education that extends to the household and community, fostering a culture of environmental responsibility. He stated:

"O, ana gyud. Unsa among trabaho diri mao ra gyapun sa balay. Tudluan gyud ang mga bata nga mao na trabaho ninyo aron nga hinlo atong palibot... ug dili hinluan puno ta ani'g lamok ug langaw. Maong kinahanglan gyud nga manghinlo. (Yes, exactly. Our work here is just the same as at home. We also teach the children that this is what should be done with garbage so that our surroundings are clean... because if it's not clean, we'll be filled with mosquitoes and flies. That's why cleanliness is really necessary.)"

Participant C contributes to waste management education by raising awareness among fellow residents about segregation and recycling practices. They actively participate in community assemblies to discuss proper garbage disposal methods, emphasizing the importance of using designated sacks for different types of waste, particularly biodegradables. He mentioned:

"Masultian jud sila maam, kay naa mana sila ginakuan gyud kanang mga assembly meeting diri sa barangay, mahisgutan man gyud na parte sa mga basura, na kung naay sako ibitay na lahi lahi, ang lata ilahi, botelya ilahi, plastic ilahi, mga cellophane, depende sa kuan kanang dili malata, isagol lang nang mga malata. Dili gani namo kuhaon nang mga malata unta labi na nang pampers (diaper), karon kay ipakuha naman og apil" (They will be reprimanded ma'am. Because the community has implemented an assembly regarding the new system of disposing of their garbage. It was part of the assembly the proper ways, that there are intended sacks for different kinds of garbage except that as long as it is biodegradable they are place into one sack.)"

The participants demonstrate a strong dedication to recycling, proper waste management, and environmental stewardship, informed by personal experience and institutional guidelines. This aligns with research findings from Nurhayati and Nurhayati

(2023), highlighting the pivotal role of education and awareness in effective waste management and broader climate change mitigation efforts.

Theme 12 - Waste Packaging and Transport

Waste Packaging and transport involve the methods and procedures used to collect, contain, and move waste from its point of origin to disposal or recycling facilities. Proper packaging and transport are crucial to preventing waste spillage, contamination, and environmental pollution. Participants A and C discuss these practices, highlighting the importance of adhering to municipal guidelines and adapting to changes in waste management policies.

Participant A provides insight into how waste collection practices have evolved in line with the directives of the Maramag municipality. According to him, biodegradable waste used to be collected without using sacks. However, when the garbage pit filled up, it became necessary to use bags to avoid scattering. He explained:

“Oh, kay ang, kami pud mag agad pud mi og unsay puy kuan sa Maramag kay under man mi sa Maramag, sa municipal. So, ug unsay ilang gi kuan mao puy among ipa tuman. Pareha karon, sa una ang nahitabo sa una sa pag permiro, e bubu na ang kuan walay sako gyud nga madala didto. O, walay sako. Dayun kanang malata di gyud na pwedi na e labay didto. So mao na nga, niya ang karon ang nahitabo karon kay napuno man ang ilahang bangag didto ilang... garbage mao to nga...gi sulod na pud na og sako, paghuman og sulod og sako iyabo didto e-pile na pud na aron di mabungkag ba. (We also follow the regulations of Maramag since we are under their municipality. Whatever they enforce, we also implement. For example, before, when we first started, trash was just thrown without any bags. There were no sacks. And the decomposable waste couldn't just be thrown there. So now, because their bins are full, we put the waste in sacks and then pile it up to avoid scattering.)”

This change shows that the town management can be purely reactive and proactive depending on the situation at hand through measures aimed at containing waste and reducing human beings' effects to the environment. Participant C, on the other hand, elaborates on the systematic approach to waste collection, emphasizing the importance of collecting garbage intact to prevent spillage. He mentioned following a scheduled collection routine to efficiently gather waste:

“Kanang makolekta namo? Oo, kanang gi kuan jud namo, na makuhaan jud namo sila na intak-intak jud bitaw na aron dili mapundo sa ilaha, kay aron dili pud kuan tan-

awon sa kuan. Mao nay kuan namo diri na kung unsay schedule namo kuhaan jud namo sila. (What we collect? Yes, we really gather it, so that we can take it bit by bit to prevent it from piling up with them, so it doesn't look messy. That's what we do here, whatever our schedule is, we really collect it from them.)"

Additionally, Participant C explained how different waste disposal methods have evolved over time. In the past, collection bags were returned to households due to landfill regulations against unbagged trash. Nowadays, empty bags are taken directly to disposal sites, enhancing sanitation and reducing pollution. He also highlighted the segregation process in Maramag, where materials like cardboard are sold, providing income for residents:

"Apil na gyud karon, kay sauna bag-o man nila, wala pay kuan wala pay bulan ni na patakaran, wala pa nag tulo ka simana na patakaran diri sa Maramag. Pag ingon sauna na ihuho, ang sako iuli namo sa tigbalay, unya tanan sako huho kay di man jud sila mudawat didto na dili ehuh. Karon, nibag-o naman pud ang ilang kuan, usab usab ang ilang sistema og patakaran dadto. Kay karon amoa bugkos na diretso nani huwad dadto, niya dili biya ma mabantayan ba Kanang naa sa garbage bag, og malabay na mabuslot man jud na, mao ranay mabungkag didto. Pero lahi sila didto sa Maramag kay gina ukay man nila. Murag naay ginapamilion nila na makuhaan nilag panginabuhi bitaw. Kay kanang karton bitaw namo, dili naman mahal in ang karton dire, tigumon namo dayon ihatag sa ilaha. (Included now, because before... they changed it, this rule has been in place for less than a month, not even three weeks here in Maramag. Before, they said to shake out the sacks and return them to the homeowner, and all sacks should be emptied because they wouldn't accept trash that hadn't been shaken out. Now, they've changed their rules again, their system and regulations have changed. Now, we tie it up and dump it directly, but it's not noticeable if it's in a garbage bag, and when it's thrown, it will surely get punctured and scattered there. But in Maramag, they dig through it. It's like they are looking for things they can use to earn a living. For example, our cartons, they are no longer sold here, we collect them and then give them away)"

The participants' insights underscore a proactive approach to waste packaging and transport, guided by municipal directives and responsive to evolving policies. Their practices demonstrate a commitment to minimizing environmental impact through effective containment and systematic waste collection. By adapting to challenges and

implementing segregation activities, they contribute to both environmental sustainability and community well-being in Maramag. This aligns with findings from Blessing et al. (2023), who emphasize the importance of adaptive waste management practices in promoting sustainable outcomes.

Conclusions

Based on the findings of the study, the following conclusions were drawn:

One (1) garbage collector working at barangay Dologon perceived climate change as a change in season, resulting in the first theme: seasonal shift. This perception suggests that the individual relates climate change to tangible, everyday experiences of altered weather. As a result, this means that local knowledge and firsthand observations play a crucial role in shaping understanding and awareness of climate change at the community level. On the other hand, the majority of the garbage collectors perceived climate change as a phenomenon that significantly impacts vegetation, resulting in the second theme: vegetation impact. This perception suggests that climate change is associated with agricultural productivity and plant health, which are vital to their community's livelihood.

Handling decomposed waste, segregation issues, and weather challenges are the challenges faced by garbage collectors. Decomposable waste poses difficulties due to foul odors, unsanitary conditions, and safety hazards, leading to the emergence of the third theme: handling decomposable waste. Moreover, inconsistent waste segregation by residents complicates the process, even with efforts at the Materials Recovery Facility (MRF), resulting in the fourth theme: segregation issues. Additionally, unpredictable weather, such as intense heat and heavy rain, disrupts waste collection, leading to the fifth theme: weather challenges. The challenges indicate that both human activities and climate change significantly impact the work and practices of garbage collectors.

Despite these challenges, garbage collectors engage in various essential practices. Waste collection is a vital community service in the barangay, and waste management education aims to raise awareness and promote sustainable practices, including advising households on proper waste management and the importance of recycling. The study also found that adherence to regulations, such as the prohibition on burning plastic, demonstrates a commitment to environmental responsibility. Separating and managing recyclables in the community, as well as inspecting dumped garbage to trace responsible parties and ensure accountability, further highlight the garbage collectors' efforts. A proactive approach to waste packaging and transport, such as updating collection by using sacks, also demonstrates their commitment. However, enforcing proper disposal poses a challenge, requiring deterrence tactics like public education and awareness campaigns. In contrast, a negative practice is the lack of waste segregation at the landfill, where everything is mixed together. Additionally, the exclusion of certain waste types, such as yard waste, from the collection service is considered a negative practice.

Overall, the findings highlight the integral role of garbage collectors in maintaining environmental hygiene and public health in Barangay Dologon. Their perceptions of climate change are deeply rooted in their daily experiences and observations. Despite facing significant challenges, these individuals demonstrate practices that are important for promoting sustainable waste management and environmental stewardship within their community.

Recommendations

After a thorough analysis of the data, the following recommendations are hereby made:

The role of garbage collectors in maintaining a healthy environment often intersects with the pressing issue of climate change, highlighting the need for enhanced knowledge and awareness with this field of work. By understanding the link between waste management and climate change, they can better grasp the impact of improper waste disposal on the environment. Equipping them with a deeper understanding of climate change could empower them and become environmental advocates. Furthermore, by conducting seminars, garbage collectors could learn regarding the increased risk of weather events and how these events could affect waste collection and disposal including the importance of proper personal protective equipment (PPE). In addition, the barangay sectors may implement clean-up drive activities every month to maintain the cleanliness within the barangay. Through this, it could help them prepare for and adapt to changing conditions, ensuring the efficient and safe execution of their duties.

To better enhance their solid waste management the barangay may impose penalties to individuals who violate the rules and regulations imposed by the municipality. In addition, the barangay may also provide designated sacks for different types of waste for proper segregation. These sacks can be coded to easily track residents who manage their waste improperly.

Moreover, by understanding the complexities of this issue, they can effectively communicate the importance of proper waste management to the public. This could contribute to a broader shift in societal attitudes towards waste reduction and recycling. For future researchers, to further understand the experience of the garbage collectors, it might be insightful to explore more of their experiences that would enable them to develop effective solutions and strategies for addressing the issue. Contributing to a more sustainable and resilient waste management system, researchers may conduct a large-scale quantitative study on municipalities' waste management practices. This study would assess the area's capacity to mitigate risks associated with waste disposal.

Compliance with Ethical Standards

The researchers ensured full compliance with ethical standards throughout the conduct of the study. Prior to data collection, informed consent was obtained from all participants after they were informed of the study's purpose, procedures, potential risks,

and benefits. Participation was entirely voluntary, and participants were informed of their right to withdraw from the study at any time without any penalty or negative consequences. Anonymity and confidentiality were strictly maintained by removing identifying information from the data and protecting all records in accordance with the Data Privacy Act of 2012 (Republic Act No. 10173). The researchers safeguarded the participants' well-being by conducting the interviews at convenient times and locations and ensuring that no physical, psychological, or social harm resulted from their participation. There was no conflict of interest in the conduct of the study, and the findings were used solely for academic and research purposes. The researchers strictly avoided plagiarism, accurately reported and interpreted the data without fabrication or bias, and properly acknowledged all sources used in the study.

REFERENCES

- Abubakar, I. R., Maniruzzaman, K. M., Dano, U. L., AlShihri, F. S., AlShammari, M. S., Ahmed, S. M. S., Al-Gehlani, W. a. G., & Alrawaf, T. I. (2022). Environmental sustainability Impacts of solid waste management practices in the global South. *International Journal of Environmental Research and Public Health/International Journal of Environmental Research and Public Health*, 19(19), 12717. <https://doi.org/10.3390/ijerph191912717>
- Adeleke, O., Akinlabi, S., Jen, T., & Dunmade, I. (2021). Towards sustainability in municipal solid waste management in South Africa: a survey of challenges and prospects. *Transactions of the Royal Society of South Africa*, 76(1), 53–66. <https://doi.org/10.1080/0035919x.2020.1858366>
- Ahmade, K., & Alam, P. (2013). Impact of solid waste on health and the environment. *International Journal of Sustainable Development and Green Economics*, 2, 165–168.
- Almer, C., & Goeschl, T. (2010). The Sopranos Redux: The empirical economics of waste crime. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1630862>
- Armijo de Vega, C., Ojeda Benítez, S., & Ramírez Barreto, M. E. (2008). Solid waste characterization and recycling potential for a university campus. *Waste management* (New York, N.Y.), 28 Suppl 1, S21–S26. <https://doi.org/10.1016/j.wasman.2008.03.022>
- Belarmino, V. B., Pagani, M. E. B., De Andrade Tanouye, A. T., Garcia, L. F., & Massuda, E. M. (2022). Perception of work and health among waste collectors. *Revista Brasileira de Medicina do Trabalho*, 20(04), 574–581. <https://doi.org/10.47626/1679-4435-2022-795>
- Bernardo, E. C. (2008). Solid-waste management practices of households in Manila, Philippines. *Annals of the New York Academy of Sciences*, 1140(1), 420–424. <https://doi.org/10.1196/annals.1454.016>
- Blessing, E., Klaus, H., & Potter, K. (2023). Educational programs on waste segregation and management. *ResearchGate*, 3481, 16. https://www.researchgate.net/publication/376645596_Educational_programs_on_waste_segregation_and_management
- Brunner, P. H., & Fellner, J. (2007). Setting priorities for waste management strategies in developing countries. *Waste Management & Research: The Journal for a Sustainable Circular Economy*, 25(3), 234–240.
- Capstick, S. B., & Pidgeon, N. F. (2014). Public perception of cold weather events as evidence for and against climate change. *Climatic Change*, 122(4), 695–708. <https://doi.org/10.1007/s10584-013-1003-1>

- Ecological Solid Waste Management Act of 2000 (RA 9003). (2021, February 19). One Planet Network. Retrieved July 15, 2024, from <https://www.oneplanetnetwork.org/knowledge-centre/policies/ecological-solid-waste-management-act-2000-ra-9003>
- Fadhullah, W., Imran, N. I. N., Ismail, S. N. S., Jaafar, M. H., & Abdullah, H. (2022). Household solid waste management practices and perceptions among residents in the East Coast of Malaysia. *BMC Public Health*, 22(1). <https://doi.org/10.1186/s12889-021-12274-7>
- Gutberlet, J., & Uddin, S. M. N. (2017). Household waste and health risks affecting waste pickers and the environment in low- and middle-income countries. *International Journal of Occupational and Environmental Health*, 23(4), 299–310. <https://doi.org/10.1080/10773525.2018.1484996>
- Hussain, F. (2020). Investigating the influences on Karachi's waste management issues: A case study on North Nazimabad, Block I. Habib University. Retrieved from <https://www.academia.edu/42137872/>
- Indiana Department of Environmental Management. (2022, May 28). Health risks and environmental impacts: Open burning. IDEM. Retrieved July 14, 2024, from <https://www.in.gov/idem/openburning/health-risks-and-environmental-impacts/>
- Kessler, R., & Sarmiento, B. (2018, October 9). Plastic trash from the 'sachet economy' chokes the Philippines' seas. *Mongabay Environmental News*. Retrieved July 15, 2024, from <https://news.mongabay.com/2018/10/plastic-trash-from-the-sachet-economy-chokes-the-philippines-seas/>
- Kihila, J. M., Wernsted, K., & Kaseva, M. (2021). Waste segregation and potential for recycling - A case study in Dar es Salaam City, Tanzania. *Sustainable Environment*, 7(1), 1935532. <https://doi.org/10.1080/27658511.2021.1935532>
- Mancini, S. D., Nogueira, A. R., Kagohara, D. A., Schwartzman, J. A., & de Mattos, T. (2007). Recycling potential of urban solid waste destined for sanitary landfills: the case of Indaiatuba, SP, Brazil. *Waste management & research : the journal of the International Solid Wastes and Public Cleansing Association, ISWA*, 25(6), 517–523. <https://doi.org/10.1177/0734242X07082113>
- Moeini, B., Ayubi, E., Barati, M., Bashirian, S., Tapak, L., Ezzati-Rastgar, K., & Hashemian, M. (2023). Effect of household interventions on promoting waste segregation behavior at source: A systematic review. *Sustainability*, 15(24), 16546. <https://doi.org/10.3390/su152416546>
- Mohammed, S., & Abdul Latif. (2014). Possible health danger associated with garbage/refuse collectors. *IOSR Journal of Environmental Science, Toxicology and Food Technology*, 8(9), 22–30. <https://doi.org/10.9790/2402-08942230>
- Nathanson, J. A. (2024). Solid-waste management. *Encyclopedia Britannica*. <https://www.britannica.com/technology/solid-waste-management>
- Nurhayati, E., & Nurhayati, S. (2023). Community waste management education: Strategies and impacts. *Jurnal Dimensi*, 12, 677-686. <https://doi.org/10.33373/dms.v12i3.5582>
- Pathak, J., Kumar, R., & Singh, P. (2024). Municipal solid waste and climate change. In *Integrated waste management: A sustainable approach from waste to wealth* (pp. 207–221). Springer, Singapore. https://doi.org/10.1007/978-981-97-0823-9_10
- Pathak, G., Nichter, M., Hardon, A., Moyer, E., Latkar, A., Simbaya, J., Pakasi, D., Taqueban, E., & Love, J. (2023). Plastic pollution and the open burning of plastic wastes. *Global Environmental Change*, 80, 102648. <https://doi.org/10.1016/j.gloenvcha.2023.102648>
- Petryk, A., Malinowski, M., Dziewulska, M., & Guzdek, S. (2019). The impact of the amount of fees for the collection and management of municipal waste on the percentage of selectively collected waste. *Journal of Ecological Engineering*, 20(10), 46–53. <https://doi.org/10.12911/22998993/112874>
- Republic of the Philippines, 2001. An Act Providing for an Ecological Solid Waste Management Program, Creating the Necessary Institutional Mechanisms and Incentives, Declaring

- Certain Acts Prohibited and Providing Penalties, Appropriating Funds Therefor, and for Other Purposes (RA 9003), Republic of the Philippines. Available at <https://www.officialgazette.gov.ph/2001/01/26/republic-act-no-9003-s-2001/>
- Reyes-García, V., García-Del-Amo, D., Porcuna-Ferrer, A., Schlingmann, A., Abazeri, M., Attoh, E. M. N. a. N., Da Cunha Ávila, J. V., Ayanlade, A., Babai, D., Benyei, P., Calvet-Mir, L., Carmona, R., Caviedes, J., Chah, J., Chakauya, R., Cuní-Sanchez, A., Fernández-Llamazares, Á., Galappaththi, E. K., Gerkey, D., & Zant, M. (2024). Local studies provide a global perspective of the impacts of climate change on Indigenous Peoples and local communities. *Sustainable Earth*, 7(1). <https://doi.org/10.1186/s42055-023-00063-6>
- Toure, A., Maiga, F., Ouattara, I., Faculty of History and Geography of the University of Social Sciences and Management of Bamako, Mali, & Institute of Economic and Social Development of Bamako, Mali. (2022). Population growth and solid waste generation in the urban municipality of Gao, Mali. *Global Scientific Journals*, 10(9). https://www.globalscientificjournal.com/researchpaper/POPULATION_GROWTH_AND_SOLID_WASTE_GENERATION_IN_THE_URBAN_MUNICIPALITY_OF_GAO_MALI.pdf
- World Bank Group. (2012, October 24). Philippines: Toward greener waste management. World Bank. <https://www.worldbank.org/en/news/press-release/2012/10/24/philippines-toward-greener-waste-management>

APA Citation:

Felicilda, C. B., Tabañag, A. A., Lantad, A. G., Lumungsod, J. R., Macaday, M. L. D. & Nuezca, A. P. (2026). BEYOND WASTE: EXPLORING THE LIVED EXPERIENCES OF GARBAGE COLLECTORS IN CLIMATE CHANGE AND MITIGATION. *Ignatian International Journal for Multidisciplinary Research*, 4(7), 1320–1346. <https://doi.org/10.5281/zenodo.21506642>

Corresponding author: *felicilda.charisse123@gmail.com*