

COMPLIANCE OF MICRO ENTERPRISES ON THE SOLID WASTE MANAGEMENT ORDINANCE OF TUGUEGARAO CITY

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Abstract— In the face of increasing global waste management challenges, the Solid Waste Management Ordinance of Tuguegarao City stands as a localized response that mandates sustainable waste management practices. This study delves into the compliance behaviors of micro-enterprises within Tuguegarao City, particularly focusing on adherence to the plastic ordinance of Tuguegarao City, which regulates single-use plastics and promotes eco-friendly packaging alternatives. Through a quantitative research design, the study achieved its objectives by employing a survey questionnaire adopted from the solid waste ordinance of Tuguegarao City. Moreover, the study involved 150 registered micro-enterprises within the Centro Barangays of Tuguegarao City, consisting of 50 market vendors, 50 food businesses, and 50 retail establishments. The data was analyzed using descriptive and inferential statistics. The result revealed that despite general awareness and cooperation with waste reduction initiatives, notable gaps persist, particularly in adopting eco-friendly packaging materials and incentives for sustainable practices. In addition, no significant differences in compliance were observed across different business profiles.

Keywords— *compliance, micro-enterprises, plastic ordinance of Tuguegarao City, solid waste management, sustainable waste management practices*

I. INTRODUCTION

The world is currently amid globalization, which has caused many advancements and changes in the lives of the people in our society, bringing about the industry of many commodities to cater to the needs of the people and for businesses to earn a sustainable income. Whenever urban waste services and management systems are poor or fail, inhabitants suffer bad living conditions – especially those in the poorest neighborhoods and slums – and social discontent rises (Cibrario, 2018). Due to the increasing problems with waste, sustainable waste management has been introduced locally and globally to address this pressing issue. Many policies and regulations have been introduced to help in mitigating waste problems. The United Nations also moved to suggest and integrate the best practices other countries may adopt to attain waste sustainability. Despite this growing support for waste management, subsequent issues about the effectiveness of policies and regulations, barriers to implementation, and possibilities of non-compliance surfaced as another problem to be solved. Solid waste management is done by collecting and properly disposing of used materials. It is also defined as a set of practices that aims to keep the environment clean and avoid environmental pollution. The idea of solid waste management

was practically coming to light once more when the increase of solid waste was felt from its effect on aggravating natural disasters and climate change. It was also a part of the United Nations Environment Programme, which aims to promote integrated systems that might be adopted by other nations around the globe (McAllister, 2015).

Republic Act 9003 provides a program that supports and lawfully enacts sustainable waste management and its procedures, prohibiting and penalizing violations. This Act was used as a reference for implementing the Solid Waste Management Ordinance of Tuguegarao City, particularly the City Ordinance No. 46-2018. Since its establishment, the local government units have been obliged to demonstrate the proper management of solid waste, which will lead to its success in promoting an ecologically sound environment. The National Solid Waste Management Commission (NSWMC) issued a resolution concerning the adoption of guidelines to establish the National Ecology Center to adhere to the Ecological Solid Waste Management Act of 2000 (Ecological Solid Waste Management Act of 2000, 2000). This issuance of RA 9003 pioneered the effort of mitigating solid wastes generated by the country and helping find solutions to counter its effects. Attached to the resolution is the mandate of NEC to facilitate the proper dissemination of information, training through education, replication, advocacy programs, and consulting before its successful implementation. Most government units in the local setting failed to comply with RA 9003 (Castillo et al., 2013).

The City of Tuguegarao sets City Ordinance No. 46-2018 to control the use of single-use plastics, cellophane, and sando bags as packaging materials; the use of straws, styro or plastic cups in drinking water, juice, and other beverages; and the utilization of styrofoam for food and beverages containers in the city of Tuguegarao and prescribing penalty thereof. Plastic cellophane, sando bags, expandable polystyrene (EPS) foams, straws, and other similar materials are extensively used primarily for bagging or packaging receptacles, and straws are rampantly used as material for consumption of beverages in commercial establishments and households within the territorial jurisdiction of Tuguegarao City. Regulation on using, selling, or providing plastic bags shall be imposed on business establishments, fast-food outlets, market vendors, food kiosks, sari-sari stores, ambulant vendors, etc. The use of any alternative legally compliant packaging material for customers, such as woven bags (bayong), cloth bags, rattan baskets, shopping bags made from recycled waste paper, and other bags made out of biodegradable materials instead of single-use plastic cellophane and sando bags, shall be mandated to store and other retail establishments (Tuguegarao City Ordinance no. 046-2018, 2018). MSMEs are any business activity or enterprise engaged in industry, agribusiness, and services, whether single proprietorship, cooperative, partnership, or corporation. According to the magna carta of MSMEs provided by the DTI, an enterprise having a total asset not more than P 3,000,000, inclusive of those arising from loans but exclusive of the land on which the business entity's office, plant, and equipment are situated is considered a micro-enterprise (Magna Carta of Micro, Small, and Medium Enterprises, 2008). Due to these extensive uses of single-use plastics, the city ordinance was created. The

researchers will use this ordinance as a basis for assessing the compliance of micro-enterprises on solid waste management as well as the adherence to the instructions thereof on using alternative, reusable/biodegradable, and environmentally friendly materials (Tuguegarao City Ordinance no. 046-2018, 2018).

Solid waste is anything that is thrown as garbage and considered of no value. Every process that human beings do leaves waste (Environmental Protection Agency United States, 2024). Solid wastes that comprise materials used for packaging, carrying consumables, and wrappers, which come in many types of materials like plastic, cardboard, cellophane, styrofoam, and paper, will be focused on in this study. People have been using plastics and cellophane to carry their consumables because they are more durable and sturdier than paper bags. Due to the rampant use of these materials, the researchers seek to assess businesses' compliance with the regulation of single-use plastic. This waste soon became a significant problem in the global community, which is now being addressed by international bodies like the United Nations, setting Sustainable Development Goal 12, which urges policies that support the shift to sustainable practices and decouple economic growth from resource use (Chan et al., 2018). Sustainable Development Goal 12 (SDG 12) ensures sustainable consumption and production patterns. It focuses on minimizing the use of natural resources, reducing waste, and managing pollutants throughout production and consumption (Bengtsson et al., 2018).

With the prohibition of using plastic in different establishments, the city encourages business establishments to use sustainable materials as alternative packaging, such as woven bags, eco bags, and other organic packaging materials, in compliance with the city's given ordinance. The prohibition of using plastic cellophane and sando bags as packaging is mainly for food kiosks, sari-sari stores, ambulant vendors, fast-food outlets, and other classification of establishments under micro and small enterprises since it is observed that they have a high rate of utilization of plastic packaging (Tuguegarao City Ordinance no. 046-2018, 2018). The study was conducted in relevance to our course subject: Sustainability and Strategic Audit. The study aims to contribute to the periodic report on the progress and implementation of the City Ordinance No. 46-2018 by assessing the compliance of the more populous unit of the business industry.

II. METHODS

This study employed a quantitative research design utilizing descriptive research methods. It aimed to describe the profile of micro-enterprises and assess their compliance with City Ordinance No. 46-2018 of Tuguegarao City.

The research was conducted in all Centro barangays of Tuguegarao City, Cagayan. The respondents of the study were registered micro-enterprises operating within these barangays, which included 50 market vendors, 50 food businesses, and 50 retail establishments, for a total of 150 respondents. A random sampling technique was employed to ensure that the selection

of participants was unbiased and representative of the target population.

The study utilized a structured questionnaire as the primary research instrument. The questionnaire was developed by the researchers and adapted from the Plastic Ordinance of Tuguegarao City (City Ordinance No. 46-2018). It was divided into two parts. The first part focused on the profile of the business, which included variables such as nature of business, capitalization, type of ownership, and number of years in operation. The respondents were identified and verified through the Department of Trade and Industry's official list of registered micro-enterprises. The second part of the questionnaire measured the level of compliance of the micro-enterprises with City Ordinance No. 46-2018.

To gather the data, the researchers first sought permission from the Vice-President for Academics through the Academic Dean of the School of Accountancy, Business, and Hospitality. A request was also made to the Department of Trade and Industry Regional Office No. 02 for the official list of registered micro-enterprises in the Centro barangays of Tuguegarao City. After obtaining approval, the researchers distributed the questionnaires to the randomly selected respondents. Business managers and owners were asked for their consent to participate, after which the completed questionnaires were retrieved and analyzed.

The data collected were analyzed using descriptive and inferential statistics. The profile of the businesses was described using frequency and percentage distributions, while compliance with the city ordinance was analyzed using frequency counts. To determine whether significant differences existed in the level of compliance when respondents were grouped according to profile variables, t-tests and Analysis of Variance (ANOVA) were employed.

III. RESULTS AND DISCUSSION

Table 1: Profile of the Business

Profile Variables		Frequency	Percentage
Nature of Business	Food Business	50	33.33
	Market Vendor	50	33.33
	Retail Store	50	33.33
	Total	150	100.00
Capital	P 100,000 or below	136	90.70
	P 100,001 - P 500,000	11	7.30
	P 500,001 - P 1,000,000	0	0.00
	P 1,000,001 - P 2,000,000	1	0.70

	P 2,000,001 - P 3,000,000	2	1.30
	Total	150	100.00
Type of Ownership	Sole Proprietorship	142	94.70
	Partnership	8	5.30
	Total	150	100.00
Number of Years Operating	Two years and below	49	32.70
	3 - 4 years	26	17.30
	5 - 6 years	19	12.70
	7 - 8 years	6	4.00
	9 - 10 years	7	4.70
	More than ten years	43	28.70
	Total	150	100.00

Table 1 presents the profile of the businesses. Results in the table show that there is equal distribution of the nature of the business, which comprises the Food business, Market vendor, and Retail store. Among the 150 enterprises, one hundred thirty-six (136) had a starting capital below or equal to one hundred thousand pesos (Php 100,000). Moreover, one hundred forty-two (142) enterprises were sole proprietors. Finally, forty-nine (49) enterprises operated for not more than two years, while forty-three (43) operated for more than ten years. This implies that most micro-enterprises had the least capital value based on the range of capital appropriate for micro-enterprises, at a maximum range of three million pesos. It also shows that micro-enterprise owners were mainly sole proprietors. Lastly, most micro-enterprises operate for only two years or less, followed by those operating for more than ten years.

Table 2. Compliance with the City Ordinance NO.46-2018 of Tuguegarao by Micro Enterprises

Compliance with the City Ordinance NO.46-2018 of Tuguegarao by Micro Enterprises	Compliance	Not Compliance	Not Applicable
The enterprise encourages customers to bring their own carry bags/observes the Bring Own Bag (BOB) Program.	59	76	15
The enterprise utilizes reusable, recyclable, or alternative eco-friendly packaging	58	68	4

such as woven bags (<i>bayong</i>), cloth/paper bags, and other similar organic materials.			
The enterprise does not utilize styrofoam, plastic bags, or other similar materials as containers for food produce and other products	26	117	7
The enterprise does not sell styrofoam, plastic bags, or plastic food and beverage containers.	54	42	54
The enterprise does not utilize plastic straws to consume beverages that can be consumed without using straws.	45	53	42
The enterprise utilizes biodegradable straws for beverage consumption.	15	81	54
The enterprise does not dump waste in public places such as roads, sidewalks, canals, esteros parks, and establishments.	132	11	7
The enterprises do not practice open burning of solid wastes (<i>pagsunog ng basura</i>).	130	12	8
The enterprise does not open dumps or bury biodegradable or non-biodegradable materials in rivers, flood-prone areas, or any body of water.	136	6	8
The enterprise does not permit the collection of non-segregated or unsorted wastes	102	44	4
The enterprise establishes categorized trash bins (biodegradable, nonbiodegradable, plastics, styro,	102	47	1

chemicals, etc.) for consumers/customers			
The enterprise conducts the segregation and storage of single-use plastic materials	122	26	2
The enterprise has reusable, recyclable, or alternative packaging available in its establishment	97	51	2
The enterprise allows customers to bring only two (2) reused regular-sized plastic bags from their previous purchases to be used as carry bags for the products purchased.	30	42	78
The enterprise's owner and/or employees are educated/informed about solid waste reduction, recycling, and composting.	134	16	0
The enterprise provides incentives/prizes/discounts to customers bringing reusable, recyclable, or any alternative packaging as their carry bag for their purchased products.	24	83	43

Table 2 shows the compliance with the City Ordinance NO.46-2018 of Tuguegarao City by Micro Enterprises. In terms of Compliance with the City Ordinance, enterprises mostly comply with the prohibition of dumping, burying biodegradable or non-biodegradable materials in rivers, flood-prone areas, or any body of water, prohibition on dumping of wastes in public places such as roads, sidewalks, canals, esteros or parks, and establishments. Results also show that the enterprises are educated/informed about solid waste reduction, recycling, and composting. However, the table also shows that the enterprises are least likely to comply with the prohibition of the use of styrofoam, plastic bags, or other similar materials as containers for food produce and other products, the provision of incentives/prizes/discounts to customers who bring reusable, recyclable, or any alternative packaging as their carry bag for their purchased products, and the use of biodegradable straws for the consumption of beverages. The results imply that despite

the respondents' knowledge about the ordinance's existence, there is still a need for more cooperation in some provisions.

The compliance section of the micro-enterprises states that respondents are educated and informed about solid waste reduction, recycling, and composting, which they cooperate with in terms of adequately disposing and segregating their wastes before the city's garbage collectors collect them. This is supported by the study of Vivar et al. (2015), which found that most businesses in Lahug, Cebu City, properly dispose of their waste on waste vans and public waste bins, and most businesses know about the solid waste management policy. Also, selected trade businesses in Davao Occidental follow the schedule of collection of waste and dump all their waste in the garbage truck and found that the said respondents are all knowledgeable of solid waste management due to their respective municipal and barangay council providing the respondents with proper education of waste management (Papas & Aznar, 2022). These results contradict the study conducted at Majengo Market, Dodoma City, Tanzania; most vendors need to be educated and aware of sustainable solid waste management, making the city's cleanliness a significant concern (Nyampundu et al., 2020). Other market vendors still dump their waste just outside their stall aisles, and they allow the collection of non-segregated wastes (Wahyuni et al., 2019),

Most respondents must comply with the prohibition of using styrofoam, plastic bags, and other similar materials, such as containers and plastic straws, to consume food and beverages. These results are parallel with another study, which states that in implementing environmental practices, food businesses will have to incur additional costs, particularly when purchasing environmentally friendly take-out containers and supplies, identified as one of the common problems businesses encounter. This made food businesses use styrofoam and plastic containers as food packaging (Idian et al., 2022). This is also found in the study by Parker (2019), which states that most retailers do not provide their customers with eco-friendly packaging because the cost of acquiring such packaging is the main reason for using plastic packaging. Finally, the respondents must comply with providing incentives/prizes/discounts to customers who bring reusable, recyclable, or any alternative packaging as their carry bag for their purchased products. This result contradicts the study conducted by Sedtha et al. (2022), which found that cafes and coffee shops encourage their customers to bring their tumblers or mugs for a discount instead of purchasing bottled water. Malls and supermarkets also work with their partners to develop promotions for eco-friendly gifts to their customers.

The research instrument of the study contains a 3-point selection where a choice of "Not Applicable" (N/A) is included. This is to give leeway for the respondents to respond by the factuality of their business practice and operations. The questionnaires were initially adopted from the Plastic Ordinance of Tuguegarao City (City Ordinance No. 46-2018), where the stated requirements and policies were not explicitly

dedicated to a specific business profile. As stated in the study of Ogutu et al. (2023), firms noted that paper-based packaging is not appropriate for other products and wet consumables as these products can quickly destroy the packaging. Retailers in Nepal stated that traditional alternative packaging does not apply to their business because meat sticks on paper and dairy products require specific packaging (Bharadwaj et al., 2023).

In this study, most enterprises feel that allowing customers to bring only two (2) reused regular-sized plastic bags from their previous purchase to be used as carry bags for the products purchased does not apply to them. Suryadi et al. (2020) found that customers of mini-market retailers are used to being given free plastic bags when buying in the mini-markets. However, due to the Banjarmasin City Government policy, which aims to reduce plastic bags, mini-market retailers cannot support the policy because customers still ask them and are likely to complain about the availability of plastic bags. These plastic bags are used in their household for other purposes, for example, to wrap wet products like meat and vegetables. These customer behaviors affected mini-market retailers' sale of goods, unable to prevent providing plastic bags to their customers. This result is also the case regarding the bring-your-own carry bag in China, where retailers depend on customer attitudes to bring a reusable bag for shopping, which allows retailers to keep plastic bags available to their establishments (Wang & Li, 2022).

The study of Agyeiwaah (2020) showed that small enterprises do not see the need to segregate their waste because they believe that they do not have anything to use the waste. Also, the owners of these small enterprises do not feel responsible for the adverse impact of their practices on the environment, for they feel that they are too small to impact the environment significantly, and the large companies are more responsible for protecting the environment.

Table 3. Test of significant difference in compliance when grouped according to the profile of the business

Profile of the Business	t/f-value	p-value	Description
Nature of Business	2.846	.061	Not significant
Capital	1.223	.304	Not significant
Type of Ownership	.660	.511	Not significant
Number of Years Operating	1.250	.289	Not significant

Table 3 portrays the test of significant differences in compliance when grouped according to the business profile. The table shows no significant difference in businesses' compliance when grouped according to profile, whether according to the nature of the business, its capital, the type of ownership, or the number of years operating. Hence, the null

hypothesis is accepted. The result implies that the respondents comply with the proper disposal and segregation of their wastes and are mostly educated and informed about the solid waste ordinance. However, some provisions need further cooperation in terms of the utilization of styrofoam, plastic bags, or other similar materials, the utilization of biodegradable straws, and the provides incentives/prizes/discounts to customers who are bringing reusable, recyclable, or any alternative packaging as their carry bag for their purchased products. This further indicates that despite the respondents' knowledge of the city ordinance, specific provisions need vigorous enforcement by the LGU to achieve full compliance. The result parallels the study conducted by Bharadwaj et al. (2023), which found that when retailers are grouped according to type of shop, they all comply with the single-use plastic ban of Nepal and reduce their use of plastic bags. Also, a study in Quezon City found no significant differences in the respondents' choice of bag type when grouped according to their sociodemographic characteristics, whether according to their gender, barangay, civil status, or age (Braganza, 2017). The implications satisfied the need for the researchers to propose a service learning program that will benefit the micro-enterprises in their full compliance with the city's solid waste ordinance. Hence, a proposed service learning program will be a part of the output of this study.

V.CONCLUSION AND RECOMMENDATIONS

The research study concludes that most micro-enterprises comprise low-capital sole proprietors operating for only two years or less. The study results show that micro-enterprises comply with the plastic ordinance of Tuguegarao City, especially regarding the proper disposal and segregation of waste. Also, the micro-enterprises are educated/informed about solid waste reduction, recycling, and composting. However, significant gaps still exist in micro-enterprise compliance, particularly in adopting alternative eco-friendly packaging and giving incentives to customers using sustainable practices. Moreover, the results show no significant differences in compliance across different micro-enterprise profiles. Hence, there is a need for interventions to enhance environmental responsibility among micro-enterprises, which will also improve the collaboration of enterprises and local authorities in promoting eco-friendly businesses.

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