

Analysis and Evaluation of Municipal Waste Management Fees in the Municipalities of Żywiec County in the Years 2013–2024.

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Abstract— The aim of this article is to analyze and evaluate changes in municipal waste management fees in the municipalities of Żywiec County in the years 2013–2024, with particular emphasis on the impact of waste management system reforms and local government policies on the level of financial burdens borne by residents. The analysis is based on data derived from resolutions of municipal councils published in the Public Information Bulletins and the Official Journal of the Silesian Voivodeship. The study employs document analysis, comparative analysis, descriptive statistical methods, as well as inductive and deductive reasoning.

The results indicate a clear and persistent upward trend in municipal waste management fees throughout the analyzed period. In the years 2013–2018, fee increases were relatively moderate, whereas after 2019 a significant acceleration in the growth rate was observed, mainly due to rising system operating costs and stricter legal requirements. The analysis also reveals considerable differentiation in fee levels between municipalities, as well as diverse local government approaches to composting fee reductions. High composting discounts constitute a tangible economic incentive for residents, while low discounts are largely symbolic in nature.

Keywords— municipal waste management, waste management fees, local government, local policy, composting, Żywiec County.

I. INTRODUCTION

The municipal waste management system is a key element of the functioning of modern municipalities. It encompasses the organization of selective waste collection, transport, and processing, as well as the mechanisms for financing the entire system. Municipal waste management fees are particularly important in this context, as they are the primary source of financing for municipalities' own waste management tasks,

while also directly impacting residents' household budgets. Therefore, the level of fees becomes a significant issue from both an economic and social perspective.

Upon becoming a member of the European Union in 2004, Poland committed to implementing EU waste management standards, in particular those arising from the Waste Framework Directive 2008/98/EC and the Landfill Directive 1999/31/EC. Implementation of these commitments involves the gradual reform of the national system, a significant step being the 2011 amendment to the Act on Maintaining Cleanliness and Order in Municipalities, which entered into full force in 2013. This reform transferred responsibility for organizing municipal waste collection and management to municipalities and introduced new rules for financing the system through a municipal waste management fee paid by property owners.

Pursuant to the Waste Act of 14 December 2012, the municipal waste management system covers both waste management and waste generation activities, and must be organised in a way that ensures the protection of human health and the environment and compliance with the waste management hierarchy.

At the local level, municipalities play a key role in organizing and financing the waste management system. They are responsible for establishing regulations for maintaining cleanliness and order, selecting the fee calculation method, rates, and possible reliefs and exemptions – including relief for property owners who compost bio-waste. At the same time, municipalities must consider the rising costs of waste collection and management, environmental requirements, inflation, and residents' income.

In this context, it is particularly interesting to examine how



municipal waste management fees have evolved in a specific region over a longer time horizon. Żywiec County, encompassing fifteen municipalities with diverse spatial and socioeconomic structures, exemplifies an area characterized by high natural values on the one hand, and systematically increasing waste management requirements and cost pressures on the other.

Analysis conducted at the county level captures the diversity of local fee policies under similar legal, environmental, and organizational conditions. This allows for comparison of decisions made by individual municipalities not only in nominal terms but also in the context of strategies for shaping residents' financial burdens and the incentives used. This approach enhances the cognitive value of regional research, going beyond a simple description of rate changes.

The aim of the article is to analyze and evaluate changes in the fees for municipal waste management in the municipalities of Żywiec County in the years 2013–2024, with particular emphasis on:

- differentiation of rates between municipalities,
- dynamics of fee changes in two sub-periods: 2013–2018 and 2019–2024,
- the importance of composting allowances as an instrument of municipal policy,
- application of selected descriptive statistics measures to assess the differentiation and upward trend of fees.

To achieve this goal, the following research hypothesis was put forward:

In the years 2013–2024, fees for municipal waste management in the municipalities of Żywiec County showed a clear upward trend, with a simultaneous increase in the differences between municipalities.

The article is divided into five parts, including a theoretical introduction, characteristics of the research area and methods, analysis of changes in fees in the years 2013–2018 and 2019–2024, discussion of statistical descriptive measures for the entire period, the role of tax relief for bio-waste composting, and a conclusion presenting final conclusions.

II. RESEARCH AREA AND RESEARCH METHODOLOGY

1) Characteristics of the Żywiec County

Żywiec County is located in the southern part of the Silesian Voivodeship, in a mountainous and foothill area, bordering Slovakia to the south, Cieszyn County to the west, Bielsk County to the north, and Sucha and Wadowice Counties to the east. The county in its current form was established in 1999 as a result of administrative reform, having previously belonged to Bielsk Voivodeship. (Żywiec County, pp. 5-6)

Żywiec County is the second largest county in the Silesian Voivodeship, covering an area of 1,040 km². According to data from the Central Statistical Office, the county has a population of over 150,000, with significant variation in population density between the city of Żywiec and the rural municipalities. (Żywiec County, pp. 5-6)

The district consists of fifteen communes:

- 1 urban commune: Żywiec,
- 14 rural communes: Czernichów, Gilowice, Jeleśnia, Koszarawa, Lipowa, Łękawica, Łodygowice, Milówka, Radziechowy-Wieprz, Rajcza, Ślemień, Świnna, Ujszoły, Węgierska Górk.

FIGURE 1. MAP OF ŻYWIEC COUNTY DIVIDED INTO COMMUNES



Source: State Fire Service JRG Żywiec, 2015

The spatial structure of a district—encompassing both urban areas and extensive rural and mountainous areas—is crucial for the organization of the waste management system. Differences in population density, infrastructure availability, and building layout translate into the costs of waste collection and transportation, which is reflected in the fees set by municipal councils. (Kotlińska, Żukowska, 2023, p. 47)

In summary, Żywiec County is a diverse research area, with overlapping geographic, demographic, and organizational factors. This context facilitates analysis of the diversity of local waste management systems and the fees paid by residents.

2) Research assumptions, data sources, and presentation of results

The analysis of fees for municipal waste management was carried out on the basis of data from resolutions of the Żywiec County municipal councils, regulating:

- selection of the fee calculation method,
- the fee rates in a given year,
- the amount of reliefs and exemptions – including reliefs for property owners who compost bio-waste.

Resolutions were obtained from:

- Public Information Bulletins of individual municipalities,
- Official Journal of the Silesian Voivodeship (via electronic search engine).

Assumptions were made to standardize the data:

- a. The analysis is based on fees for segregated municipal waste

(collected selectively), without a composter, which allows for a comparison of the basic fee variant in individual municipalities.

- b. The average household was assumed to consist of a family of four, which allows for the comparison of per-person rates across different municipal regulations. Assuming a four-person household corresponds to the most commonly used assumptions in comparative analyses of local government fees and allows for the standardization of results across municipalities using different fee calculation methods.
- c. The values presented in the tables and analysis refer to the average monthly cost of the fee per person, calculated as the average of the rates applicable in a given year (if the rates changed during the year, they were averaged proportionally to the period of their validity).
- d. The new municipal waste management system, introduced under the amended Act on Maintaining Cleanliness and Order in Municipalities, has been in force since 1 July 2013. For this reason, the data for 2013 only cover the second half of the year (July-December), which was taken into account when calculating average values.

For the years 2013-2018 and 2019-2024, tabular summaries were prepared, presenting the monthly fees in individual municipalities. The results were then graphically presented using line charts, allowing for the dynamics of change to be captured over time.

The remainder of the study also utilized descriptive statistics measures—the arithmetic mean, median, mode, and standard deviation—calculated for each year in the period under review. These measures allow for a better assessment of both average fee levels and the degree of variation between municipalities.

The study also used inductive and deductive reasoning methods, which allowed for the formulation of generalizations based on empirical data and the interpretation of observed changes in the context of applicable legal regulations and economic conditions of the functioning of the municipal waste management system.

In summary, the adopted methodology combines the analysis of local law, synthetic data summaries, and descriptive statistics. This enables both detailed comparisons of rates across individual municipalities and the identification of general trends and structural changes in the fee system.

III. CHANGES IN MUNICIPAL WASTE MANAGEMENT FEES IN 2013–2024

As of July 1, 2013, each municipality became the owner of municipal waste within its area, and residents were required to pay a "garbage fee" to the municipality instead of directly billing the waste collection company. The goal of the reform was to increase waste separation and recycling and reduce illegal dumping, in line with the waste hierarchy and the "polluter pays" principle. (Kotlińska, Żukowska, 2023, pp. 44-47)

This part of the article presents the results of an analysis of changes in municipal waste management fees in the

municipalities of Żywiec County throughout the entire period of 2013–2024. Due to the scale of the changes and the reforms introduced after 2019, two subperiods were distinguished: **2013–2018** and **2019–2024**. This allows for the capture of both the initial, relatively moderate rate growth dynamics and the subsequent, much more rapid fee increase.

1) Fee changes from 2013 to 2018

Table 1 presents changes in fees for selective municipal waste management (without a composter) over the years 2013–2018 in the municipalities of Żywiec County, expressed as an average monthly cost incurred by one resident.

TABLE 1. CHANGES IN FEES FOR SELECTIVE MUNICIPAL WASTE MANAGEMENT WITHOUT A COMPOSTER IN 2013–2018 (IN PLN).

Name of the Commune	2013	2014	2015	2016	2017	2018
Czernichów	6.00	6.00	8.00	8.00	8.00	10.00
Gilowice	7.00	7.00	7.00	8.50	10.00	13.00
Jeleśnia	7.00	7.00	7.00	7.00	8.00	8.50
Koszarawa	5.00	5.00	5.00	7.00	7.00	7.00
Linden	6.00	6.00	6.00	6.00	8.00	10.00
Łękawica	6.00	7.00	7.00	7.00	7.00	9.00
Łodygowice	8.00	8.00	8.00	8.00	9.50	9.50
Milówka	8.00	8.00	8.00	8.00	8.50	8.50
Radziechowy-Wieprz	6.00	8.00	8.00	8.00	9.00	9.00
Rajeza	6.00	6.00	7.00	8.00	8.00	10.00
Ślemień	8.00	8.00	8.00	8.00	8.00	8.00
Swine	7.00	7.00	7.50	8.00	8.00	10.00
Ujsoly	4.25	4.25	5.00	5.81	6.46	7.42
Hungarian Hill	7.00	7.00	7.00	8.50	8.50	10.00
Zywiec	12.00	12.00	12.00	12.00	12.00	12.00

Source: prepared based on resolutions published on the website of the Official Journal of the Silesian Voivodeship www.dzienniki.slask.eu

Analysis of the data in Table 1 indicates that between 2013 and 2018, most municipalities in Żywiec County experienced a **clear but relatively moderate upward trend** in waste management fees. In many municipalities, rates increased by several zlotys per person during this period.

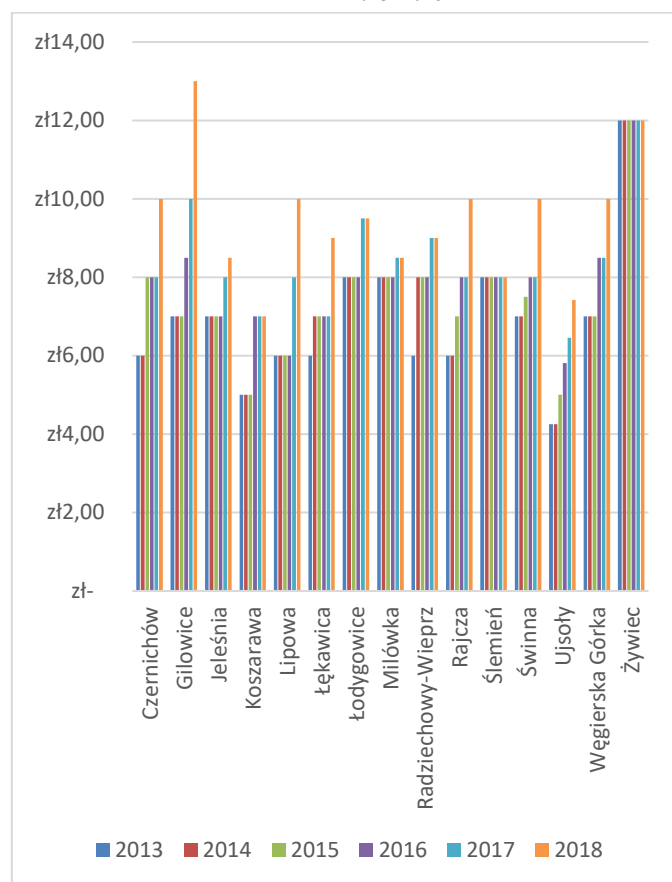
A particularly large increase was recorded in the **Gilowice commune**, where the rate increased from PLN 7.00 in 2013 to PLN 13.00 in 2018, i.e. almost doubling. Significant increases also occurred in the **Czernichów, Lipowa, Rajeza** and **Świnna communes**, where fees increased from PLN 6-7 to PLN 10, representing an increase of 40-70%. In the **Jeleśnia** and **Łękawica communes**, the increase was milder (PLN 1-3 in the analysed period), and in **Milówka** the fee increased by only PLN 0.5 over six years.

It's worth noting the **Żywiec** and **Ślemień municipalities**, where rates remained unchanged during the period under review – PLN 12.00 and PLN 8.00, respectively. While this demonstrates the stability of their pricing policies, it may also suggest mounting cost pressures, which forced more dramatic adjustments in subsequent years.

The average monthly fee rates for individual municipalities

in 2013–2018 are illustrated in Chart 1.

CHART 1. FEES FOR MUNICIPAL WASTE MANAGEMENT PER CAPITA IN ŻYWIEC COUNTY IN 2013–2018.



Source: own study based on data from Table 1.

Chart 1 confirms that during the analyzed period, there was a **systematic but relatively steady increase** in rates in most municipalities. The exceptions are Żywiec and Ślemień, where price curves remain flat. The lowest rates in 2013–2014 were observed in the **Ujsoly municipality**, while **Żywiec** consistently maintained some of the highest fees in the district.

stable growth between 2013 and 2018, which can be attributed to, among other things, rising operating costs, the need to adapt to EU and national requirements, and the gradual expansion of waste management infrastructure. However, the scale of the increase was significantly lower than in the period after 2019. However, this increase was relatively mild and spread over time, distinguishing this period from later, more dramatic rate adjustments.

2) Fee changes for 2019–2024

The 2019–2024 period saw a much **more dynamic increase in fees**. These years saw tightening of requirements for selective collection and recycling, and increases in transportation, waste treatment, and energy and labor costs. Table 2 presents the changes in municipal waste management fees (separate, without a composter) between 2019 and 2024 in the surveyed municipalities.

TABLE 2. CHANGES IN FEES FOR SELECTIVE MUNICIPAL WASTE MANAGEMENT WITHOUT A COMPOSTER IN 2019–2024 (IN PLN).

Name of the Commune	2019	2020	2021	2022	2023	2024
Czernichów	12.25	21.00	28.00	32.00	37.00	37.00
Gilowice	16.00	22.00	26.00	29.00	40.00	40.00
Jeleśnia	11.50	18.00	20.25	28.50	31.00	31.00
Koszarawa	7.00	20.00	20.00	23.00	28.00	28.00
Linden	13.00	20.00	25.50	27.00	27.50	30.00
Łękawica	14.00	21.00	35.00	38.00	41.00	44.00
Łodygowice	13.00	20.00	20.00	27.00	27.00	32.00
Milówka	13.00	22.00	22.00	27.00	29.00	33.00
Radziechowy-Wieprz	12.67	22.00	29.00	35.00	40.00	42.00
Rajcza	11.67	20.00	24.00	29.00	40.00	40.00
Ślemień	11.50	19.00	19.00	27.00	32.00	32.00
Swine	15.00	22.00	25.00	31.00	32.00	36.00
Ujsoly	7.50	21.50	25.00	32.00	35.00	38.00
Hungarian Hill	14.00	22.00	27.00	30.00	33.00	33.00
Zywiec	14.00	25.50	29.00	36.00	36.00	36.00

Source: prepared based on resolutions published on the website of the Official Journal of the Silesian Voivodeship www.dzienniki.slask.eu

Analysis of the data in Table 2 shows that fee rates increased **dramatically between 2019 and 2024**. In many municipalities, current rates are several times higher than in the first year of the new system. For example:

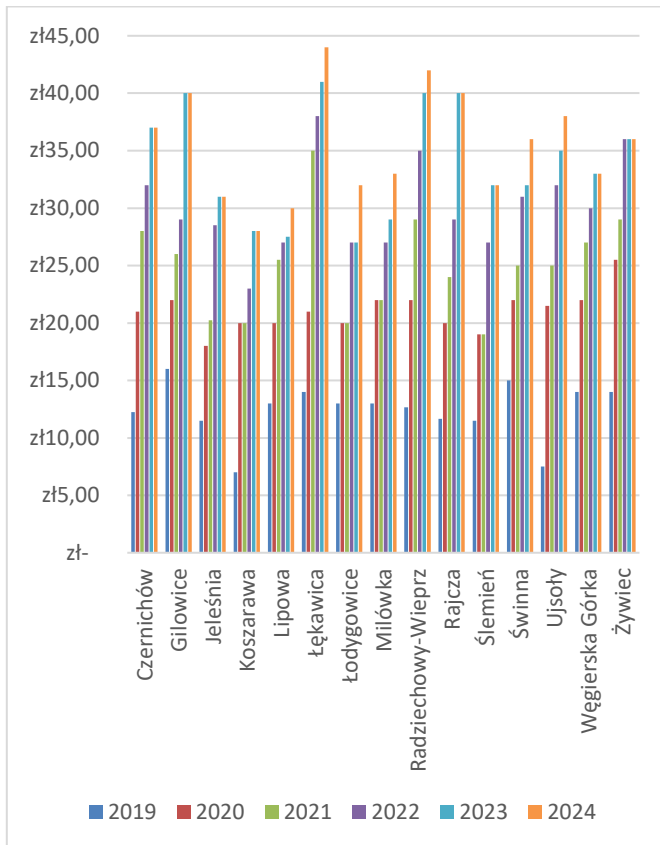
- in the **Łękawica commune** the rate increased from PLN 14.00 (2019) to PLN 44.00 (2024),
- **Radziechowy-Wieprz** commune – from PLN 12.67 to PLN 42.00,
- in the **Gilowice commune** – from PLN 16.00 to PLN 40.00,
- in the **Rajcza commune** – from PLN 11.67 to PLN 40.00.

Even in municipalities with lower initial fee levels, such as **Ujsoly** or **Koszarawa**, the scale of the increase is very clear: from PLN 7.50 to PLN 38.00 and from PLN 7.00 to PLN 28.00, respectively. In 2024, the highest fee was recorded in the **Łękawica municipality (PLN 44.00)**, while the lowest was in the **Koszarawa municipality (PLN 28.00)**.

The scale of these changes means that in many municipalities, fees in 2019–2024 increased several times compared to the levels in the first years of the system's operation, which significantly changed the relationship between waste management costs and the financial burden on households.

The rate growth dynamics in 2019–2024 are illustrated in Chart 2.

CHART 2. FEES FOR MUNICIPAL WASTE MANAGEMENT PER CAPITA IN ŻYWIEC COUNTY IN 2019–2024.



Source: Own study based on data from Table 2.

The steep growth trajectories are clearly visible in Chart 2. In most municipalities, especially in 2020–2022, when stricter separate collection requirements, rising costs of waste services, and general inflation in local government operating costs coincided. In 2023 and 2024, the dynamics in some municipalities remained high, although in some units (e.g., Żywiec) a relative stabilization of rates at a high level can be observed.

a significant acceleration in fee growth after 2019. While in the initial years of the period under review, changes were rather evolutionary in nature, after 2019 they took the form of abrupt changes, significantly burdening household budgets. At the same time, differences between municipalities increased – both in terms of fee levels and the rate of their growth.

IV. RELIEFS FOR COMPOSTERS IN THE CONTEXT OF MUNICIPAL POLICY

Reliefs for single-family property owners who compost bio-waste are an important instrument of local waste policy, combining the environmental dimension (reducing the mass of waste collected by the municipality, implementing the idea of a circular economy) with the financial dimension (reducing fees for households that make additional segregation efforts). (Pchałek, 2021, p. 412)

Pursuant to the Act on Maintaining Cleanliness and Order in Municipalities, the municipal council may introduce a partial

exemption from waste management fees for single-family property owners who compost municipal bio-waste. The amount of this exemption should reflect the proportion of system cost reduction resulting from the reduction in bio-waste collection from properties. (Pchałek, 2021, pp. 410-415). Table 3 presents the per-capita composting allowances in the municipalities of Żywiec County in 2020–2024.

TABLE 3. AMOUNTS OF TAX RELIEF FOR COMPOSTERS PER RESIDENT IN 2020–2024 (IN PLN).

No.	Name of the commune	2020	2021	2022	2023	2024
1	Czernichów		1.00	2.00	2.00	2.00
2	Gilowice		2.00	3.00	3.00	3.00
3	Jeleśnia		1.00	5.00	5.00	5.00
4	Koszarawa		3.00	3.00	4.00	4.00
5	Linden	1.00	1.00	1.00	1.00	1.00
6	Łękawica		10.00	10.00	10.00	10.00
7	Łodygowice		1.00	3.00	3.00	5.00
8	Milówka		-	10.00	11.00	11.00
9	Radziechowy-Wieprz		-	7.00	7.00	7.00
10	Rajcza	2.00	2.00	2.00	10.00	10.00
11	Ślemień	1.00	1.00	1.00	1.00	1.00
12	Swina		3.00	3.00	2.00	2.00
13	Ujsoly		3.00	5.00	5.00	5.00
14	Hungarian Hill	1.00	4.00	5.00	4.00	4.00
15	Zywiec	2.00	1.00	1.00	1.00	1.00

Source: own study based on resolutions on the website of the Official Journal of the Silesian Voivodeship www.dzienniki.slask.eu.

Analysis of the data contained in Table 3 allows us to formulate several important conclusions:

- Large differences in the amount of tax relief between municipalities.**
 - In the **Łękawica commune**, the relief amounted to PLN 10.00 per resident and remained at this level throughout the 2021–2024 period, which means a relatively strong financial incentive to compost.
 - Similarly high tax reliefs were recorded in the **Milówka** and **Rajcza communes**, where in 2024 they amounted to PLN 11.00 and PLN 10.00, respectively.
 - In turn, in the communes of **Lipowa**, **Ślemień** and **Żywiec**, the discounts remained at a low level of PLN 1.00–2.00, which limits their potential motivational power.
- Different course of changes over time.**

In some municipalities, the discounts were gradually increased (e.g., **Jeleśnia**, **Ujsoly**, **Węgierska Górka**), in others – they were kept constant (e.g., **Łękawica**, **Ślemień**, **Lipowa**). In a few cases, the discounts were introduced only after the system had been in operation for some time (e.g., **Milówka**, **Radziechowy-Wieprz**).
- The relationship between the relief and the level of the basic fee.**

Comparison of Table 2 and Table 3 shows that in

municipalities with high base rates (e.g. **Lękawica, Radziechowy-Wieprz, Rajcza, Gilowice**) the discounts for the composter are relatively high, which may indicate a conscious compensation policy – on the one hand, the municipality increases the fees, on the other hand, it offers a clear incentive to compost.

To better illustrate the importance of relief, you can refer to specific examples from 2024:

- in the **Lękawica commune** the basic fee is PLN 44.00, while for households composting bio-waste – PLN 34.00, which means a **difference of PLN 10 per person**,
- in the **Radziechowy-Wieprz commune** the fee without a composter is PLN 42.00, and with a composter – PLN 35.00,
- in the **Lipowa or Ślemień communes** the differences are only PLN 1.00 per person.

An analysis of the amount of composting allowances indicates that in some municipalities, composting allowances serve as a real **environmental policy instrument**, while in others they are more symbolic in nature. (Gawłowski, Mreńca, 2024, p. 35)

From the perspective of the economic efficiency of the waste management system, only incentives with a clear financial scale can actually influence household decisions regarding bio-waste composting. Symbolic incentives serve primarily a declarative function and do not constitute a significant incentive to change residents' behavior.

In summary, the analysis of composting allowances indicates that Żywiec County municipalities utilize this instrument to varying degrees as a tool for influencing residents' behavior. High and stable allowances can promote the widespread use of composting and reduce the volume of waste entering the system, which in the long term can contribute to lower waste management costs. However, the variation in allowance levels between municipalities reflects the differing priorities of local waste policy and the budgetary capabilities of individual local government units.

V. THE USE OF STATISTICAL MEASURES IN ASSESSING THE DYNAMICS OF FEES

To further analyze changes in waste management fees in the municipalities of Żywiec County, selected descriptive statistics measures were used: **arithmetic mean, median, mode, and standard deviation**. These measures were calculated for each year in the 2013–2024 period, based on fee rates in fifteen municipalities. Table 4 presents the synthetic results of the calculations for each year.

TABLE 4. RESULTS OF STATISTICAL MEASURES FOR FEES FOR SORTED MUNICIPAL WASTE (WITHOUT A COMPOSTER) IN THE MUNICIPALITIES OF ŻYWIEC COUNTY IN 2013–2024.

Year	2013	2014	2015	2016	2017	2018
Arithmetic mean	6.88	7.08	7.37	7.85	8.40	9.46
Median	7.00	7.00	7.00	8.00	8.00	9.50

Year	2013	2014	2015	2016	2017	2018
Dominant 1	6.00	7.00	8.00	8.00	8.00	10.00
Dominant 2	-	-	7.00	-	-	-
Dominant 3	-	-	-	-	-	-
Dominant 4	-	-	-	-	-	-
Standard deviation	-	-	1.63	1.41	1.36	1.58
Year	2019	2020	2021	2022	2023	2024
Arithmetic mean	12.41	21.07	24.98	30.10	33.90	35.47
Median	13.00	21.00	25.00	29.00	33.00	36.00
Dominant 1	13.00	22.00	20.00	27.00	40.00	40.00
Dominant 2	14.00	-	29.00	-	-	32.00
Dominant 3	-	-	25.00	-	-	33.00
Dominant 4	-	-	-	-	-	36.00
Standard deviation	2.45	1.74	4.35	3.99	4.94	4.69

Source: prepared based on resolutions published on the website of the Official Journal of the Silesian Voivodeship www.dzienniki.slask.eu

The analysis of mean, median and mode values allows us to draw the following conclusions:

1) **Strong upward trend in the average fee.**

In 2013, the arithmetic average was PLN 6.88, while in 2024 it was PLN 35.47, which means a more than **five-fold increase** over twelve years. In the first sub-period (2013–2018), the average increased from PLN 6.88 to PLN 9.46 (approx. 37%), while in 2019–2024 – from PLN 12.41 to PLN 35.47 (almost a three-fold increase).

2) **Parallel increase in median.**

The median – as the value dividing the set of rates into two equal parts – increased from PLN 7.00 in 2013 to PLN 36.00 in 2024. This means that **in most municipalities** the fees were increasing, and the upward trend concerned not only the extreme values, but the entire population of municipalities.

3) **Change in the level of the most frequently occurring rate (dominant).**

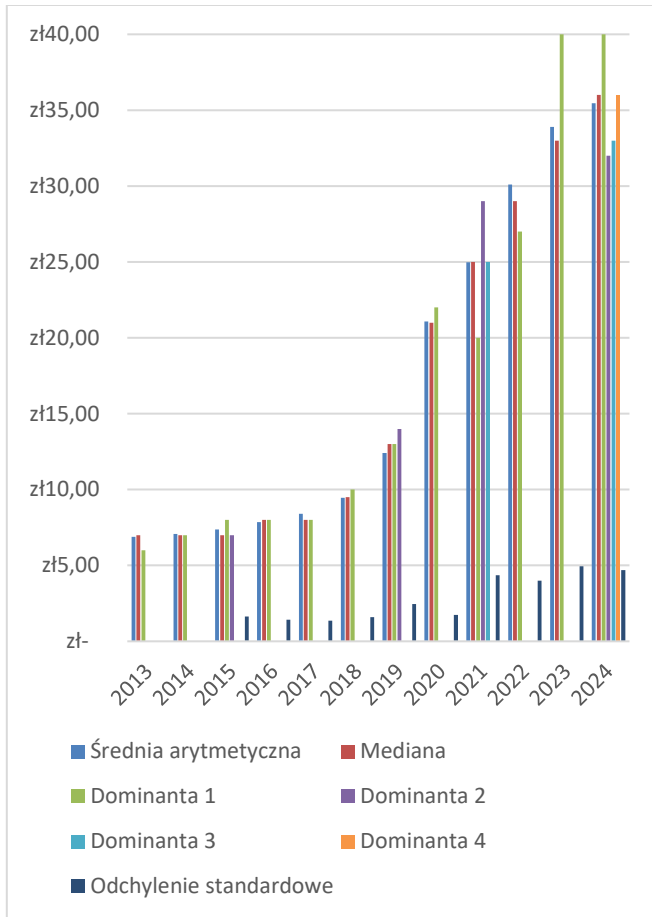
In 2013, the most common rate was PLN 6.00, while in 2024 it was PLN 40.00. This indicates a shift in the entire rate distribution towards higher price levels. The presence of more than one dominant rate in some years results from the fact that identical fee rates were applied simultaneously by several municipalities.

4) **Increased disparities between municipalities.**

The standard deviation, which is a measure of the dispersion of values around the mean, increased from approximately 1.5 in 2018 to over 4.6 in 2024. This means that **the differences in fee amounts between municipalities are now much greater** than in the initial period of the new system.

The course of changes in selected statistical measures in the years 2013–2024 is presented in Chart 3.

CHART 3. STATISTICAL MEASURES OF FEES FOR SORTED MUNICIPAL WASTE (WITHOUT A COMPOSTER) IN THE MUNICIPALITIES OF ŻYWIEC COUNTY IN 2013–2024.



Source: Own study based on data from Table 4.

Figure 3 shows that the mean and median curves are similar, confirming the relatively even distribution of rates across the study population. The acceleration in growth of these measures after 2019 is particularly noticeable. The dominant curve, despite some fluctuations, has also reached high values in recent years, indicating that municipalities are most often setting rates at levels significantly higher than in the initial years of the system's implementation.

The increase in standard deviation, however, indicates increasing **differentiation in fee policies** among municipalities. Some municipalities maintain rates at relatively lower levels, while others—especially those with higher system operating costs—decide to introduce very high fees, close to the maximum allowable levels specified in announcements by the President of the Central Statistical Office (GUS). (Dziegiel-Matras, 2024; GUS, 2017)

systematically increased between 2013 and 2024, and the growth rate after 2019 was significantly higher than in previous years. At the same time, the increasing standard deviation indicates increasing differences between municipalities, which may result from both different local conditions and varying local government strategies.

VI. END

Municipal waste management poses a significant challenge for local government units, requiring them to ensure high environmental protection standards, meet national and EU legal requirements, and maintain the financial stability of the system. An analysis of municipal waste management fees in the Żywiec County municipalities from 2013 to 2024 revealed both the general trend of change and the variation in fee policies at the local level.

The research conducted confirmed that:

1) **Municipal waste management fees showed an upward trend throughout the entire period under review.**

The average monthly fee per person increased more than fivefold – from PLN 6.88 in 2013 to PLN 35.47 in 2024. A similar increase was recorded for the median and mode. This means that the research hypothesis was **positively verified**.

2) **After 2019, there was a sharp acceleration in the rate growth dynamics.**

While changes were moderate between 2013 and 2018, rates in many municipalities increased significantly after 2019. This phenomenon can be attributed to the rising costs of waste collection and management, tightening separate collection requirements, and the impact of inflation on the operating costs of local government units.

3) **The differences between municipalities have increased.**

The increase in standard deviation indicates that the differences in fees between municipalities are currently greater than in the initial years of the analyzed period. Some municipalities – such as Łękawica, Radziechowy-Wieprz, and Rajcza – have introduced very high fees, while others, such as Koszarawa, maintain them at relatively lower levels.

4) **Composting allowances play a varied role in municipal policies.**

In some municipalities (e.g., Łękawica, Milówka, Rajcza), the tax relief amounts provide a significant financial incentive for composting bio-waste, which supports the implementation of circular economy goals. In other municipalities, the relief is symbolic, limiting its actual motivational function.

The varying financial and organizational situations among municipalities demonstrate that there is no single, universal solution for determining fee rates. Each municipality must individually adapt its waste management policy to **local conditions**, taking into account spatial conditions, development structure, budgetary possibilities, and residents' expectations.

The obtained results may provide practical support for municipal authorities in designing the municipal waste management fee policy, in particular in terms of selecting the level of rates and the construction of incentive reliefs.

In the longer term, it may be necessary to develop **more coherent district or regional** waste management strategies that will allow for better coordination of activities, the use of economies of scale and reducing differences in the burden on residents of individual municipalities.

The conducted research allows us to state that the aim of the article has been achieved and the hypothesis **about the upward**

trend in fees in the communes of Żywiec County in the years 2013–2024 has been unequivocally and positively verified.

The research conducted may constitute a starting point for further analyses, including:

- linking the level of fees to the actual costs of operating the system in individual municipalities,
- the relationship between rates and the level of selective collection and recycling,
- assessment of the impact of composting discounts on residents' behavior and the effectiveness of the system in environmental and financial terms.

The conclusions obtained from the analysis of the Żywiec County may also be useful for other local government units that face similar challenges related to the rising costs of waste management, regulatory pressure and the need to reconcile environmental requirements with an acceptable level of burden for residents.

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