sciendo
10.2478/eual-2024-0005

EU Agrarian Law
volume XIII.
number 1/2024

FINACIAL ASPECTS OF MUNICIPAL WASTE MANAGEMENT

FINANČNÉ ASPEKTY NAKLADANIA S KOMUNÁLNYM ODPADOM

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I Introduction

Management of Municipal Solid Waste has been growing in complexity and in costs within the last decades[1]. They emphasize that municipalities have been facing problems in keeping the management of their municipal waste in financial balance. Increasing public awareness, stricter legislation, and large generation of municipal waste have led to high costs concerning related services. Therefore, municipalities are starting to charge their citizens for the services provision, and the methods utilized vary significantly. The increase in environmental awareness, stricter legislation, urban concentration, population growth, and development of new products has resulted in a challenge that strikes different countries in various ways, depending on the stages of development regarding environmental and solid waste management. For the waste management process to be successful, efficient storage of waste is an important issue. The storage of waste is the preliminary stage for the disposal, reuse or conversion of waste into energy without harming the environment and people[2]. Therefore, the waste storage process is very important for the waste management process[3].

In the waste sector, EU Member States implement EU legislation. They rely on EU Directives and their waste legislation and policies. The Slovak Republic also followed these procedures by amending the Waste Act 79/2015 Coll. and issued strategic documents

1 Alzamora, Barros (2020)

2 Gull et al. (2023)

3 Pradenas et al. (2020)

Abstract (EN)

Municipal waste management plays a crucial role in our communities and has far-reaching implications. Effective waste management contributes to environmental conservation. By reducing waste, recycling, and implementing sustainable practices, we protect our ecosystems and natural resources. Due to the increasing volume of waste and the increasingly complex administration of its collection and disposal, solid waste management is quickly becoming a demanding issue for municipalities all over the world. The objective of the paper was to describe the impacts of communal waste management on municipal budgets and to compare waste management expenditure intensity. The legislative changes, the focus on minimising waste for disposal and promoting a material recycling orientation will have a significant impact on municipal budgets. Local authorities must adjust to the standards established by the European Union. The Slovak Republic will need to progressively adopt these standards by incorporating them into national law.

Keywords (EN)

disposal, expenditure intensity, municipal budgets, recycling, waste managements

Abstrakt (SK)

Nakladanie s komunálnym odpadom zohráva v našich samosprávach kľúčovú úlohu a má ďalekosiahle dôsledky. Efektívne odpadové hospodárstvo prispieva k ochrane životného prostredia. Znižovaním množstva odpadu, recykláciou a uplatňovaním udržateľných postupov chránime naše ekosystémy a prírodné zdroje. Vzhľadom na rastúci objem odpadu a čoraz zložitejšiu administratívu spojenú s jeho zberom a likvidáciou sa nakladanie s tuhým komunálnym odpadom rýchlo stáva náročným problémom pre obce na celom svete. Cieľom príspevku bolo opísať vplyv nakladania s komunálnym odpadom na rozpočty obcí a porovnať intenzitu výdavkov na odpadové hospodárstvo. Legislatívne zmeny, zameranie sa na minimalizáciu odpadov určených na zneškodnenie a podpora orientácie na materiálové zhodnocovanie budú mať významný vplyv na rozpočty obcí. Samosprávy sa musia prispôsobiť štandardom stanoveným Európskou úniou. Slovenská republika bude musieť tieto normy postupne prijať ich zapracovaním do národnej legislatívy.

Kľúčové slová (SK)

zneškodňovanie, náročnosť výdavkov, rozpočty obcí, recyklácia, odpadové hospodárstvo

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in accordance with EU legislation[4]. Legal regulations and government incentives are very important in terms of participation in the waste management process. It is possible to ensure the success of the waste management process with the incentive or regulation policies to be carried out by the state[5]. Therefore, necessary legal arrangements should be made in the decisions.

The process of separating waste is also very important for the efficiency of waste management and refers to the classification of the resulting wastes according to their types[6]. In this context, the main purpose is to provide maximum benefit from the waste management process by separating the wastes according to their types, harmfulness and recycling status. Additionally, the waste management system had difficulties in this regard. The separation of waste plays an important role for effective waste management[7]. In this way, it may be possible to collect and recover materials with recycling potential. Efficient storage of waste is also very important in this process. Important question in municipal waste management is how to lead people towards more desired behaviour, represented typically by lower overall waste generation and higher waste separation[8]. This fundamental question is followed by other authors, that according to the analysis of waste recycling at the EU level, Slovakia is a country with a waste recycling rate below the average measure of municipal waste recycling[9]. Waste management is a complex municipal problem. Slovakian government accepted concrete measurements on the municipal waste decreasing, storage decreasing, and recycling increasing. The measurements are connected to the law of waste, law of bottles backup, and economic tools, such as increasing fees for waste storage at dumps and waste ponds.

Financial difficulties of municipal authorities to finance municipal services can be attributed to overreliance on central government intervention. At the same time, some authors believe that any organization that relies on the central government interventions in operation leads to failure because they are often limited[10]. Most of the funds for running municipal waste management operations usually come from limited municipal budgets, making it difficult to improve overall municipal financial systems. Therefore, it is proposed that local governments generate revenues from internal and external sources of funds to finance their operations[11].

The main source of financing waste management at the municipal level in Slovakia is the local fee for municipal and minor construction waste. When setting the local fee for municipal and minor construction waste, a municipality takes into account the actual costs of waste disposal[12]. As per Act no. 582/2004 Coll. on local taxes and the local fee for municipal waste and small construction waste, the municipalities levy charges for managing municipal and minor construction waste from individuals and legal entities utilizing properties within the municipality's jurisdiction. Should the municipality facilitate the recycling of this waste, the expenses should be offset by the income the municipality generates from the recycling process. The funds collected from the local fee for municipal and minor construction waste are to be exclusively utilized by the municipality for the gathering, transportation, recycling, and disposal of municipal and minor construction waste[13].

The local fee for municipal and minor construction waste is obligatory, exhibiting more characteristics of a fee than a tax[14]. The local fee for municipal and minor construction waste is levied to offset the expenses of managing the municipal waste generated from the usage or ownership of properties within the municipality. The rate of the fee is set by the municipality based on the existing waste collection system[15].

The fee is levied on an individual who maintains a permanent or temporary residence in the municipality, and on a corporate entity that is authorized to utilize properties within the municipality for non-business purposes. If the municipality implements a bulk waste collection system, the fee rate ranges from a minimum of €0.01 to a maximum of €0.2 per litre, dm^3, or kilogram of municipal or minor construction waste. In the absence of a bulk waste collection system in the municipality, the fee rate is set between €0.02 and €0.2 per individual per calendar day, as stipulated by Act no. 582/2004 Coll. on local taxes and a local fee for municipal waste and minor construction waste.

4 Marišová, Valenčíková (2022)
5 Bui et al. (2023)
6 Hashemi-Amiri et al. (2023)
7 Dinçer et al. (2024)
8 Struk (2019)
9 Taušová et al. (2020)
10 Guerrero, Maas, Hogland (2013)
11 Sharholy, Ahmad, Vaishya, Gupta (2007)
12 Sedláková (2016)
13 Act no. 582/2004 Coll. on local taxes and a local fee for municipal waste and small construction waste
14 Popovič (2016)
15 Vartašová, Červená (2019)

II Objective and Methodology

The objective of the paper was to describe the impacts of communal waste management on municipal budgets and to compare waste management expenditure intensity.

The basis for understanding the impact on waste creation and processing is their characteristics and legal division into types according to their quantity and separation possibilities. In the detailed description of the collection and disposal of waste types, we explained their importance for the municipality and the collection and processing system. In this way, we have achieved the requirement of understanding their impact on municipal budgets as well as the management of municipal waste within the scope of self-government. The increasing volume of waste creates space for the search for other financial options that could cover this problem and be a possible solution for municipalities in the coming years.

We analysed the financial demands of waste management at the local level on a sample of municipalities from Nitra and Košice regions. The number of municipalities included in the sample study is 40, with half of municipalities belonging to the Nitra region and other half to the Košice region. The main indicators of the study are:

- share of revenues from the local fee for municipal waste and minor construction waste in the total current revenues of municipalities,
- share of revenues from the local fee for municipal waste and minor construction waste per inhabitant,
- share of current expenditures on the collection and transport of municipal waste and minor construction waste in the total current expenditures of municipalities,
- share of current expenditures on the collection and transport of municipal waste and minor construction waste per inhabitant.

We conducted our assessment of the financial intricacies of waste management over a span from 2017 to 2021. The data for our analysis was sourced from the Statistical Office of the Slovak Republic and the final accounts of chosen municipalities.

III Discussion

3.1 Impacts of communal waste management on municipal budgets

The legislative changes, the focus on minimising waste for disposal and promoting a material recycling orientation will have an impact on the public administration budget. According to available information from abroad, the deflection from landfilling towards the recycling has resulted in a significant increase in prices at landfills as well as facilities for the energy use of waste, and at the same time, it resulted in a shift in the financing of waste sorting and recycling from municipalities to producers (however, this applies only to selected types of waste in accordance with Act no. 79/2015 Coll. on waste, not to other types of waste that can be materially/energetically recovered such as construction waste, textiles, bulk waste, biodegradable municipal waste, etc.)[16]. In this context, it is expected that the given direction of waste management in Slovakia will have a significant impact on the public administration budget, just like abroad. In some cases, expenditure could still be considered during the budget process and the necessary expenditure could be included (at least partially) in the budget or in the medium-term budgetary framework. Other than budget sources could also be used for funding, e.g. donations, sources from the business sector or specific funding schemes. In such cases, the implementation of the given suggestion will have no minor impact on the approved budgetary limits. The affected entity will also be able to cover part of the impact by rationalisation measures leading to savings in other expenditure (a significant level of sorting, not only of selected types of waste).

The local self-government deals with the collection and disposal of the following types of waste on its territory:

- MMW – Mixed Municipal Waste,
- BW – Biodegradable Waste (green waste, grass, leaves, branches),
- BMW – Biodegradable Municipal Waste (specific kitchen waste),
- SCW – Small Construction Waste,
- BW – Bulk Waste,
- HW – Hazardous Waste,
- TW – Textile Waste.

Mixed Municipal Waste (MMW)

MMW is one of the most widespread and by volume (mass) the largest type of waste generated in the territory of the municipality. Currently, according to the analyses, on average about 35% of selected types of waste (paper, plastics, metals, multi-layer combined materials, glass), about 48% of BW/BMW, about 7% of textiles and the rest of the waste that is unprocessable or even hazardous (batteries, paint packaging, etc.) are still present in the mixed municipal waste. In terms of impacts on local government, this

16 Act no. 79/2015 Coll. on waste

type of waste currently burdens municipal budgets the most. According to the Act no. 79/2015 Coll. on waste, the municipality has to take care of this waste, either by collecting and disposing of this type of waste itself (through its own company) or by contracting an external company to collect and dispose of it on the basis of a public procurement procedure. As this type of waste is generated on a daily basis, the frequency of exports adapts accordingly. Currently, the absence of end facilities (landfills, facilities for the energy use of waste, technologies for processing or treatment of MMW) causes its price to increase exponentially and is expected to continue to increase in the future. In general, it can be stated that the price growth of this type of waste, depending on the location in Slovakia, will rise by tens of percent (it is assumed from 50% to 150% compared to current prices). This will result in a significant financial impact on the budget of towns and municipalities, which will have to include this price increase in the fees for residents. This budgetary impact can only be mitigated by sufficient waste sorting, where, according to experience from abroad, consistent sorting of mixed municipal waste at source (by residents) can sort out up to 50% of its volume on average and thus reduce the pressure on municipal budgets. Secondary raw materials that fall under extended producer responsibility are not financed by municipalities but through so-called Producer Responsibility Organisations (PROs). In the end, the consumer still pays for all of this in products, but these types of waste are not funded by municipal budgets. High waste sorting and recycling targets introduced by European and Slovak legislation result in the fact that the sorting rate of selected types of waste is constantly increasing. Its purpose is to reduce the disposal of MMW in landfills or its incineration without the use of energy. In the case of high waste sorting and recycling rates, the impact on municipal budgets might not be so dramatic.

Biodegradable Waste – BW (green waste, grass, leaves, branches)

BW collection has been implemented in Slovakia for several years. In the beginning, its collection or processing was preferred through composters. As the amount of BW processed in composters is not counted towards the recycling rate (and cannot be counted in the context of the act on fees for waste disposal in landfills), a large number of municipalities have switched to collection through brown collection containers. Although the system is simpler and more targeted, it is also more expensive, as BW has to be collected at regular intervals, especially from March to November. Handling and collection costs are essentially identical to MMW collection, BW recovery at composting facilities was until recently equivalent to landfill. Thus, in terms of impacts on the budget of local authorities, nothing has changed; the change to collecting biodegradable waste separately from mixed municipal waste has not reduced costs for municipalities. After the approval of the amendment to the Waste Act, especially in the area of waste treatment before disposal in landfills, the "imaginary scissors" between the price of MMW disposal and the price of BW recovery will be opened.

Biodegradable Municipal Waste – BMW (kitchen waste)

The obligation to separate BMW is stipulated in Act No. 79/2015 Coll. on Waste from 1. January 2021. Until the end of 2020, only some municipalities in Slovakia separated BMW. This obligation is completely new for municipalities and brings with it a number of problems. Not only financial (collection and disposal of this waste is significantly more expensive than MMW collection) but also technical (the decree of the Ministry of Environment of the Slovak Republic, which came out at the beginning of 2021, "disrupted" the proposed and standardised collection system, which municipalities were providing in the framework of procurement in 2020). At the same time, the BMW collection system requires special types of collection containers and different collection techniques that are used for MMW collection. The impacts on local government are significant, in some regions the total cost of collection and disposal is in the order of 50 to 150% higher than for conventional MMW collection This causes a large financial impact on local governments, which may be even more significant in the near future.

Small Construction Waste (SCW)

In terms of quantity, small construction waste ranks third to fourth in terms of impacts on local government budgets in terms of waste management expenditure. Out of 100% of all waste generated on the territory of municipalities, SCW makes up approximately 2.5–3.0%. Due to its nature, i.e. a mixture of all kinds of waste (construction waste, plastics, glass, hazardous waste, etc.), it is very difficult to sort it at source. Currently, the cost of SCW disposal is rising rapidly, primarily due to the nature of its composition. In the case of sorting at the collection yards, namely into normal construction waste, which makes up 60–70% of the waste (tiles, bricks, concrete) and the rest (residual waste such as plastic pipes, bags of cement, damaged sanitary ware such as sinks, etc.), approximately 60–70% of the SCW can be materially recovered by the R5 process (shredding and recycling of construction waste).

The costs of shredding and reusing recycled material is significantly lower (around 50% or more) than landfilling them, and increases the rate of material recycling in municipalities, thus meeting targets for higher waste recycling rates. Therefore, in terms of impacts on the budget of towns and municipalities, it is necessary to consider, where possible, the reuse of SCW through material recycling before its disposal in landfills.

Bulk Waste (BW)

BW, just like SCW, belongs to the groups of waste, which by their nature contain various types of waste, through wood, plastics, iron, SCW, furniture, sanitation, carpets, floors, etc. Given this fact, BWs are among the most expensive in terms of price (handling, transport, disposal). This type of wastes, as well as SCW, can be sorted at the collection yard and subsequently processed in the form of R3 (waste from wood and wood chips, plastics, tires, etc.) or in the form of R1 (energy recovery through a process of shredding and preparation into the form of alternative fuels) and only then disposed of in a landfill (of those wastes in BW that are not recyclable or energy recoverable). Approximately 50% of bulk waste can be processed other than by landfilling. Activity R3 – material recycling – is significantly cheaper than activity R1/ D1, therefore the impacts on local government budgets in this case will only be in the form of sorting costs at local government collection yards. Also in the short term (and due to limited capacities in landfills and increasing landfill fees) activity R1 – energy recovery – will be approximately 30–40% cheaper than activity D1 – landfilling – therefore, in the shortest possible time, municipalities should consider introducing BW sorting at source or at collection yards as soon as possible.

Hazardous Waste (HW)

The basic types of HW in towns and municipalities are mainly packaging from paints, solvents, thinners, various electrical waste, batteries, paints themselves, etc. The incidence of this waste is relatively low, municipalities mostly provide it either through collection yards where residents can bring it or through pre-announced collections several times a year (especially if the municipality does not have a collection yard). Although in terms of volume compared to BCW, MMW, SCW, etc., the hazardous waste components are only a negligible amount, nevertheless they far exceed all types of waste in terms of price, and it is anticipated that due to the limited end uses (Hazardous Waste Energy Recovery Facilities, HW landfills, or HW recovery facilities), their prices will increase rapidly, and for some types of hazardous waste, this can be in the hundreds of percent range. For these wastes, prevention is a big problem – limiting the creation of these wastes or recycling them, and with the current trend of waste production, it is expected that the volume of waste will increase by around 10 to 15% compared to the current situation.

Textile Waste (TW)

Textiles are one of the commodities for which there is no possibility of material recycling, such as for paper, plastics, glass, metals and other sub-recyclable materials. Textile waste can therefore be recovered in the following way:

- throw undamaged textiles into containers that are already in common use in Slovakia (various types of charity, etc.);
- to create a space for "textile-sharing" similar to what is done abroad. This means creating a space for residents to set up so-called 'clothing exchanges' where residents, especially from weaker economic groups, could take clothes to be reused or used for other purposes (bags, cloths, etc.);
- to create a separate collection of textiles from mixed municipal waste so that textiles that can no longer be used as above are not landfilled but energy recovered.

The area of textile collection is still a little known area, it has minimal impact on the budgets of municipalities, so if it is actively collected, it is possible that the approximately 4.7% of textiles that are still in MMW, once properly sorted, can reduce the costs of municipalities for the management of MMW and increase the recovery of this type of waste. According to the Framework Directive on waste, the separate collection of textiles should be introduced from 1. 1. 2025 (point 1, Article 11 of the Directive).

It is clear from the above information that the impacts on the budgets of local governments will be significant in the coming years and it is assumed that their stabilisation and slight increase will be gradual in the following years (approximately from 2027–2030), when the Slovak Republic will have already implemented all the necessary legislative conditions and a new waste management system, preferring recycling over disposal, will already be operational and established. Local governments will have to adapt to the trends set by the European Union and the Slovak Republic will have to follow them gradually by implementing them in national legislation and start considering a gradual increase of fees for residents and legal entities. The aim will be to have a balanced waste management budget while adopting strategies to minimise waste going to landfill or incineration

without energy recovery and to maximise recycling of most types of waste.

3.2 Comparison of waste management expenditure intensity

Figure 1 presents an overview of average values of the share of revenues from local fee for municipal waste and minor construction waste in total current revenues of municipalities in the period 2017–2021. In years 2018, 2019 and 2020, the highest values of this indicator were achieved by smallest municipalities (size category up to 500 inhabitants). In the last observed year, municipalities up to 1000 inhabitants recorded highest value at the level of 3.03%. At the opposite end of spectrum are the largest municipalities, where values of this indicator ranged from 1.58% to 1.87%.

The highest average proportion of revenues from local fee for municipal waste and minor construction waste per inhabitant was achieved by municipalities of the size group from 1001 to 2000 inhabitants (Fig. 2). In the last observed year, it was up to €18.36. Municipalities in other categories did not exceed the limit of €16 per inhabitant during the entire period.

When analysing the average share of current expenditures on collection and transport of municipal waste and minor construction waste in total current expenditures of municipalities, we found out that smallest and largest municipalities achieve the highest values of this indicator (Fig. 3). In the case of municipalities up to 500 inhabitants, the highest value of 7.13% was recorded in 2020. Continuously, the lowest average share of waste collection expenditures

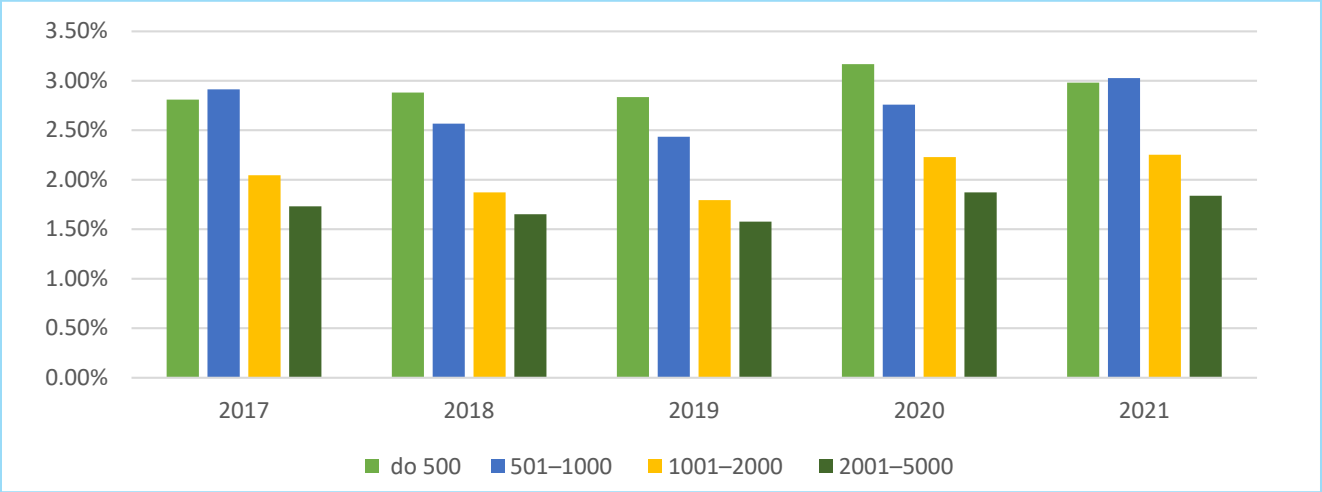


Fig. 1 The average share of revenues from the local fee for municipal waste and minor construction waste in the total current revenues of municipalities (in %)
Source: Own processing

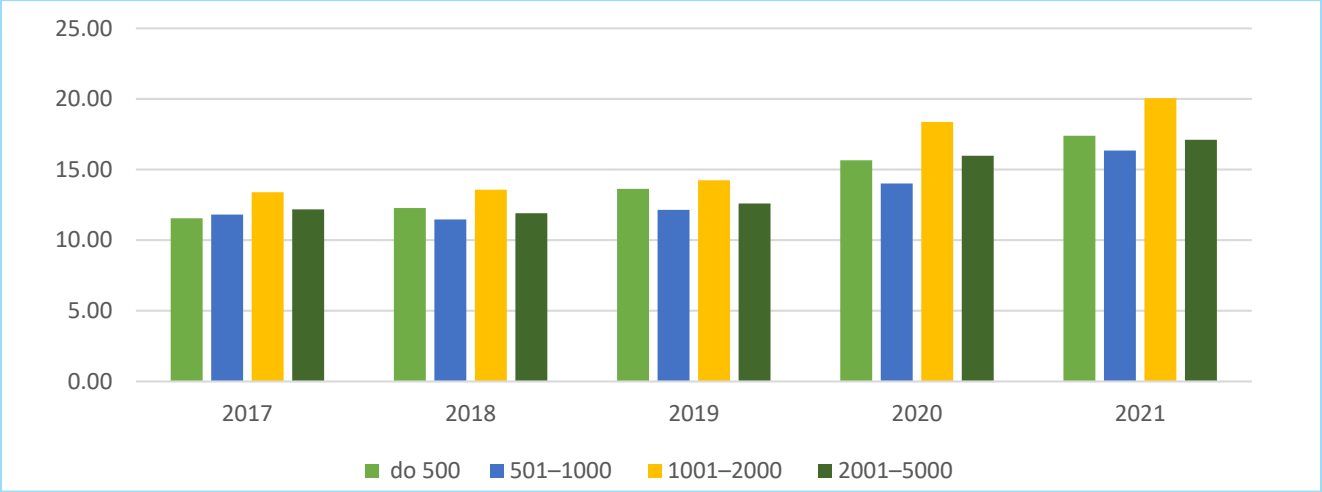


Fig. 2 The average share of revenues from the local fee for municipal waste and minor construction waste per inhabitant (in €)
Source: Own processing

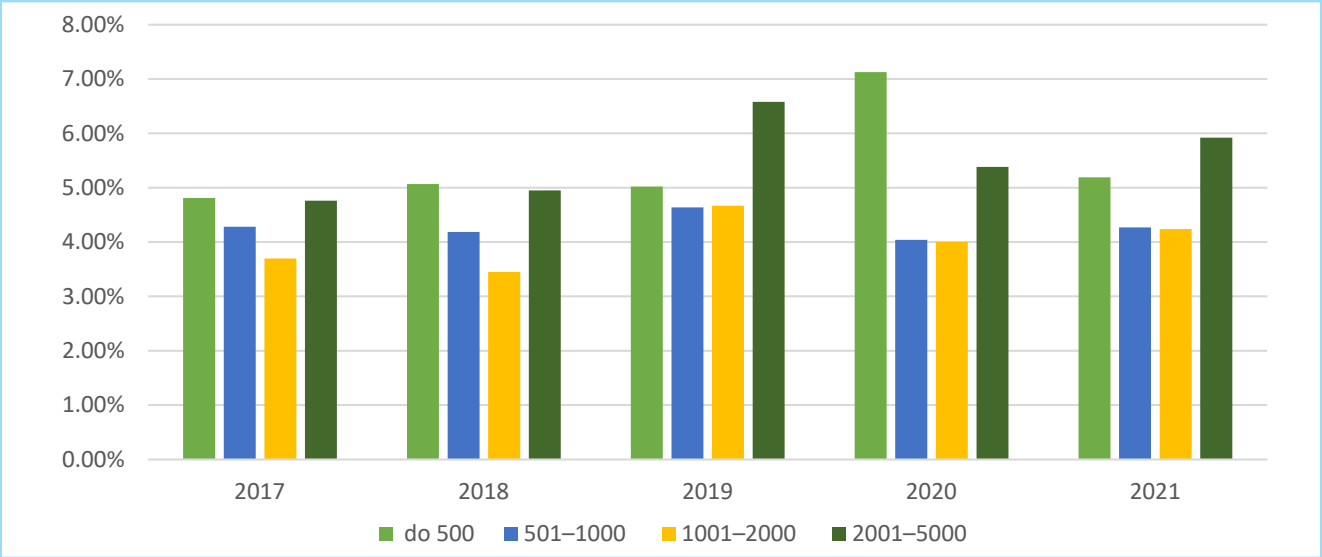


Fig. 3 The average share of current expenditures on the collection and transport of municipal waste and minor construction waste in the total current expenditures of municipalities (in %)
Source: Own processing

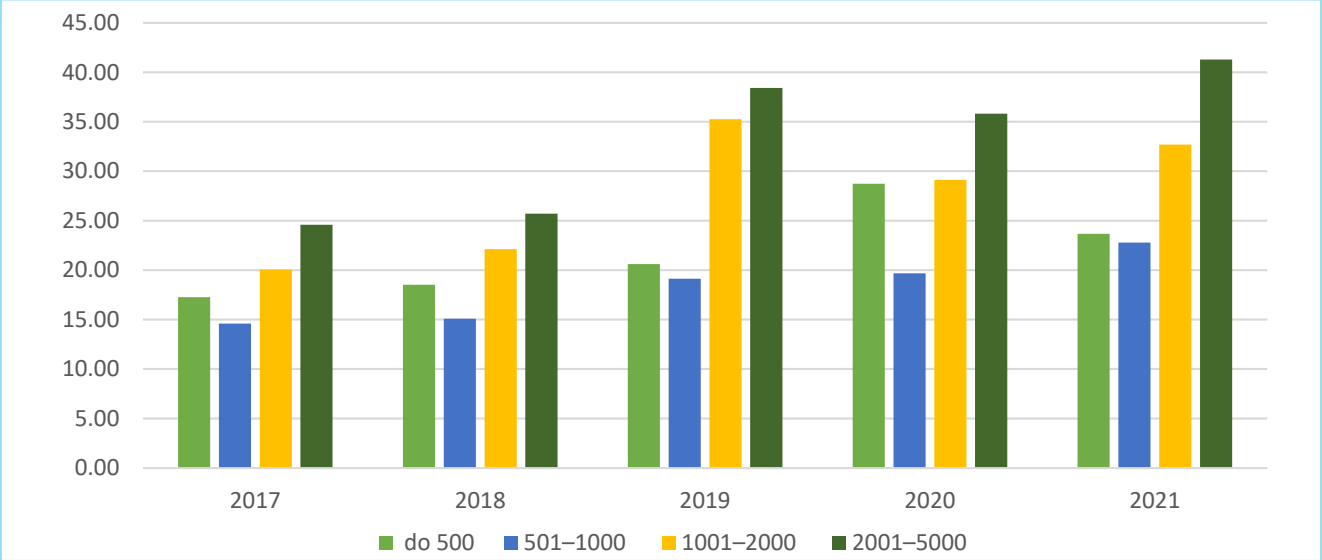


Fig. 4 The average proportion of current expenditures on the collection and transport of municipal waste and minor construction waste per inhabitant (in €)
Source: Own processing

was achieved by municipalities from 1,001 to 2,000 inhabitants.

Figure 4 presents average financial cost of collecting and transporting municipal waste and minor construction waste per capita. Among largest municipalities, this cost indicator varies between €24.58 and €41.29. Overall, we can conclude that there is a significant increase in expenditures for the provision of this local public service in all municipalities. This trend is partly due to legislative changes in waste management, which have imposed new responsibilities on municipalities, leading to an increase in overall expenses for the collection and disposal of municipal waste.

IV Conclusion

The alterations in legislation, along with the emphasis on reducing waste for disposal and advocating for material recycling, will influence the budget of public administration. It is anticipated that the waste management approach in Slovakia, aligned with practices overseas, will notably affect the public administration budget. The provided information indicates that local governments will face significant budgetary impacts in the upcoming years. It is anticipated that a gradual stabilization and modest increase in budgets will occur from around 2027 to 2030. By this time, the Slovak Republic is expected to have fully implemented all required legislative measures and established a new waste management system that prioritizes recycling over disposal. Local authorities will need to align with the directives set by the European Union, with Slovakia progressively incorporating these directives into national laws and considering incremental fee hikes for both residents and businesses. The objective will be to achieve a balanced waste management budget while implementing strategies to reduce landfill and non-energy recovery incineration, and to enhance the recycling of various waste types.

When comparing revenues from local fee for municipal waste and current expenses for the collection and transport of municipal waste, we can state that in almost all municipalities, expenses for providing this local public service exceed revenues derived from the local fee for municipal waste. To cover remaining expenses, municipalities have to use other own financial sources. Among the 40 municipalities analysed, only 4 stood out as exceptions where revenues generated from local waste collection fees were sufficient to cover all routine expenses associated with municipal waste collection.

Acknowledgment

This research was funded by the Slovak Research and Development Agency under the Grant No. APVV-20-0076 "entitled" "Waste and Construction – Modelling the Effectiveness of Alternative Options for Cooperation between Adiministrative Authorities".

References

1. Act no. 79/2015 Coll. on waste and on the amendment of some laws in the current version, Available online: https://www.epi.sk/zz/2015-79
2. Act no. 582/2004 Coll. on local taxes and a local fee for municipal waste and small construction waste.
3. Alzamora, B. R. – Barros, R. T de V. 2020. Review of municipal waste management charging methods in different countries. In Waste Management, 2020, no. 115, pp. 47–55. doi: 10.1016/j.wasman.2020.07.020. Available at: https://www.sciencedirect.com/science/article/pii/S0956053X2030386X
4. Bui, Tat-Dat. et al. 2023. Municipal solid waste management technological barriers: A hierarchical structure approach in Taiwan. 2023. In Resources, Conservation and Recycling, 2023, no. 190.
5. Dinçer, H. et al. 2024. Effective waste management in service industry: Fuzzy-based modelling approach for strategic decision-making. In Waste Management & Research, 2024. doi: 10.1177/0734242X241242682. Available at: https://www.researchgate.net/publication/379607832_Effective_waste_management_in_service_industry
6. Guerrero, A.A. – Maas, G. – Hogland, W. 2013. Solid waste management challenges for cities in developing countries. Available at: https://nqr.gov.in/sites/default/files/File%201_waste%20mgt.pdf
7. Gull, A. A. – Atif, M. – Hussain, N. 2023. Board gender composition and waste management: Cross-country evidence. In The British Accounting Review, vol. 55, 2023, no. 1. doi: 10.1016/j.bar.2022.101097
8. Hashemi-Amiri, O. et al. 2023. An allocation-routing optimization model for integrated solid waste management. In Expert Systems with Applications, vol. 227, 2023. doi: 10.1016/j.eswa.2023.120364
9. Marišová, E. – Valenčiková, M. 2021. EU legislative support in the waste sector: Podpora legislatívy EÚ v odpadovom sektore. In EU agrarian Law, vol. 10, 2021 no. 2, pp. 21–27. ISSN 1339-9276
10. Popovič, A. 2016. Zamyslenie sa nad miestnym poplatkom za rozvoj. In Justičná revue: časopis pre právnu teóriu a prax, vol. 68, 2016, no. 11, pp. 120–127. ISSN 1335-6461
11. Pradenas, L. – Fuentes, M. – Parada, V. 2020. Optimizing waste storage areas in health care centers. In Annals of Operations Research, vol. 295, 2020, no. 1, pp. 503–516. doi: 10.1007/s10479-020-03713-6
12. Sedláková, S. 2016. Separation of Waste – One of the Ways to Reduce the Cost of Waste Management Municipality, Revista administratie si management public. Faculty of Administration and Public Management, Academy of Economic Studies, Bucharest, Romania, vol. 2016, no. 26, pp. 48–59
13. Sharholy, M. – Ahmad, K. – Vaishya, R.C. – Gupta, R.D. 2007. Municipal solid waste characteristics and management in Allahabad, India. In Journal of Waste Management, 2007, no. 27, pp. 490–496.
14. Struk, M. 2019. Waste Management Incentive Programs and Municipal Finance. In 7th International Conference on Sustainable Solid Waste Management, Crete Island, Greece, 26–29 June 2019.

15. Taušová, M. – Mihaliková, E. – Čulková, K. – Stehlíková, B. – Tauš, P. – Kudelas, D. – Štrba, Ľ. – Domaracká, L. 2020. Analysis of Municipal Waste Development and Management in Self-Governing Regions of Slovakia. In Sustainability, 2020, no. 12, 5818. https://doi.org/10.3390/su12145818
16. Vartášová, A. – Červená, K. 2019. Views on Quality of Tax Regulation in the Slovak Republic (Focused on Real Property Taxation). Praha : Nakladatelství Leges, 2019, 93 p. ISBN 9788075024169

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